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NEWS SUMMARY

GENERAL

Looters 'threat to flood homes'

Homes flooded by the thaw could become a target for looters, police said...

The North West Water Authority said the situation would be even worse when industry started again today...

In Wales, where some areas are still cut off by snow, a row has erupted between the Welsh Office and the Government over special aid for the emergency.

Councils claim they will have to spend three times as much as they were bargaining for before setting aid and are seeking a meeting with Welsh Secretary Nicholas Edwards...

3m jobless likely

Employment Secretary Norman Tebbit said it was likely unemployment would top 3m this month and would go on rising through the first part of this year.

TUC cautious

Confidential TUC paper discloses that Congress House is taking a cautious view of militant proposals put up by big unions on the Government's new labour relations legislation.

Sinai talks

Israeli Defence Minister Ariel Sharon started a visit to Egypt to discuss detailed plans for Israel's final withdrawal from Sinai.

Sinn Fein arrest

Danny Morrison, Provisional Sinn Fein publicity director, who was sent to Canada to counter the Rev Ian Paisley's anti-IRA campaign, was arrested at Toronto airport.

U.S. missile test

Ohio, 812th (2842nd) U.S. Trident submarine, fired its first missile while cruising submerged off Cape Canaveral in the U.S. Air Force's eastern test range.

Fatal cast

Paul Hurst, 14, of Gateshead, died on a fishing trip when he was struck on the head by a four-ounce lead sinker on a line cast by another angler.

Finland votes

Finns began voting in the first stage of finding a successor to Urho Kekkonen, the country's ninth President, who resigned last year because of ill health.

Divers killed

Five U.S. Navy divers died in an airlock accident aboard the submarine Grayback after a training exercise off the western Philippines.

Gone fishing

Some 60 Hull and Grimsby trawlers are going to New Zealand to crew two of Britain's biggest trawlers—sold because of the decline in fishing opportunities.

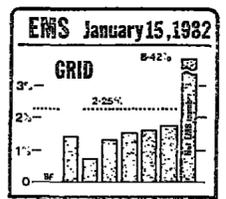
Briefly...

Billingsgate fish market moves tomorrow to a new site in London's West India docks. Gang boss Raffaele Ferrara was arrested by Naples police in their fight against the Neapolitan Mafia. England's cricketers were 207 for six at the end of the fourth day of the Fifth Test against India in Madras.

BUSINESS

Japan to act on trade barriers

JAPAN will take "drastic" action soon to remove non-tariff barriers to trade, its International Trade and Industry Minister said.



The chart shows the two constraints on the European Monetary System exchange rates. The upper grid based on the lowest currency in the system defines the cross rates from which no currency except the lira may move more than 2 1/2 per cent.

The lower chart gives each currency's divergence from the central rate against the European Currency Unit (ECU) as a basket of European currencies.

BELGIAN FRANC devaluation rumors were strongly denied by the Government in Brussels last week. The currency remained the weakest member of the European Monetary System, but was well within its alarm bell divergence limit.

DE LOREAN, the UK Government-backed sports car company, expects to hear today whether the Export Credits Guarantee Department will grant it \$60-\$70m in finance guarantees.

LEAK of the Monopolies Commission decision on the takeover battle for the Royal Bank of Scotland is to be investigated by the Government.

CAR TRANSPORTER companies are expected to face a Monopolies and Mergers Commission inquiry soon.

UK COMMERCIAL VEHICLE production should jump by nearly 30 per cent this year from 1981's depressed levels, according to the Economist Intelligence Unit.

MINERS in South Wales vote tomorrow on the Coal Board's 9.5 per cent offer. Bad weather delayed the ballot, expected to hold the key to the outcome nationwide.

DUNLOP Group's 600 workers at the Semtex floor coverings plant in South Wales which the company intends to close voted to continue their occupation in spite of an ultimatum to quit the site or lose severance payments.

ICL's managing director calls for massive expansion in Government spending on the computerisation of public services in today's special FT supplement.

French to rewrite Nationalisation Bill after legal setback

BY DAVID WHITE

THE FRENCH Government will today take urgent steps to prepare new terms of compensation for its controversial Nationalisation Bill, after the country's Constitutional Council rejected parts of the Bill.

The council's ruling, on Saturday night, was the most serious setback for the Government's economic strategy since President Mitterrand was elected in May.

Although the council, the supreme arbiter on constitutional issues, approved the basic principle of the takeover programme, it turned down several clauses, particularly to do with the way shareholders are compensated.

Its decision has the effect of holding up the law under which the Government is to take over five top industrial groups, the larger private-sector banks and the country's two most powerful holding companies. It will also substantially increase the cost of the proposed nationalisation.

The rejection of the compensation clauses, which the council did not see as separable from the overall text — forces the Government to go back through Parliament.

M Jean Le Garrec, Secretary of State in charge of the nationalisation programme said yesterday he hoped the delay could be trimmed to "four or five weeks."

Two interministerial meetings are scheduled today, and a meeting of the Socialist parliamentary party tonight, in a race to get new compensation clauses ready for Cabinet approval on Wednesday. Before then, they must be seen by the Council of State.

The current special session of Parliament, due to close at the end of this month, is expected to be extended to make room for a debate on a new compensation article.

The Government had hoped to promulgate the law in the next few days. Chairmen would have been named to the newly nationalised companies on Wednesday.

The council, to which the law had been referred by opposition members of the National Assembly and the Senate, accepted the Government's right to nationalise all the companies on the list, its method of payment with long-term state bonds, a dits exemption of foreign-controlled banks.

This puts to an end the threat of nationalisation over foreign banks — including the French Barclays subsidiary — whose deposits were over the minimum threshold applied to French banks.

Last autumn, the Government ignored a recommendation made by the Council of State, a consultative body, that these banks

should be included to avoid discrimination.

The Constitutional Council, made up of nine appointees and exercising independent powers, rejected six articles and one paragraph of the Bill which the National Assembly finally voted a month ago.

The decision, published yesterday in the Official Gazette, is much tougher than the Government had been expecting, and cannot be appealed against.

The council said the final compensation formula — based partly on historical share prices, partly on profits and assets — was unconstitutional because of the way share values were calculated and because shareholders were not being paid dividends for 1981.

It also overruled a clause allowing chairmen of nationalised companies to sell off overseas shareholdings at their discretion. This clause was seen as a precaution in the event of legal clashes over the nationalisation of interests outside France.

Last, it rejected the exemption of banks owned by co-operatives from the bank nationalisation scheme. This decision, it was made clear yesterday, does not affect the main co-operative banks such as

Continued on Back Page

Polish loyalty pledges may stop

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Walesa 'will be set free soon'

By Our Foreign Staff

MR LECH WALESA, the Solidarity leader will be released from detention "in the very near future," Mr Stefan Stanszewski, the Polish ambassador to Britain, said yesterday.

Mr Stanszewski told reporters at Heathrow Airport: "I cannot tell you the exact date, but it will be soon. The decision has been made."

The ambassador was greeting his wife, who had flown in from Warsaw. He said he had "just been told from Warsaw" of the "good news about Lech Walesa."

Other reports from Warsaw, however, suggested that hard negotiations are continuing over Mr Walesa's release, and that he is still insisting he will not talk to the Government without the dismantling of the martial law.

But there were indications that the Church, in the person of Archbishop Jozef Glemp, the Polish Primate, may be putting pressure on Mr Walesa to start negotiations without all his demands being met.

In an interview with Reuter in Warsaw, Senator Larry Pressler, the only senior U.S. politician to have visited Poland since martial law was declared on December 13, said he "got the impression that the Primate was being critical of Mr Walesa's intransigence."

Mr Pressler said Archbishop Glemp had twice referred to Mr Walesa as an "inexperienced politician," who "had not been long in politics and did not know how complicated things are."

Mr Pressler said: "The Polish Primate told me that Mr Walesa is expecting the Communist Party to go down on bended knees and apologise for what happened."

The Archbishop was extremely anxious to get serious negotiations underway again and was worried that if this did not happen there could be civil war.

The Archbishop told Mr Pressler, who is chairman of the U.S. Senate's "Food for Peace" sub-committee, that there were radicals on both sides. While he criticised General Wojciech Jaruzelski, he also implied that there were tougher and more extreme men waiting in the wings.

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Ronson soldiers on in attempt to control ACC

BY JOHN MOORE

MR GERALD RONSON, chairman of Heron Corporation, is pushing ahead with his campaign to wrest control of Associated Communications Corporation, the entertainment empire headed until last week by Lord Grade, from Mr Robert Holmes à Court, the Australian entrepreneur.

Mr Ronson today meets bankers and lawyers to discuss his next move after a three-hour meeting on Saturday with Mr Holmes à Court at which Heron's indicated £42.5m offer for ACC was discussed.

Yesterday, Mr Ronson said: "I am not walking away. There are a lot of options open to us. ACC has good businesses and we are prepared to pay a price."

ACC and Mr Holmes à Court, whose master company, the Bell Group of Australia, has launched an agreed bid of £36m for ACC, has already snubbed last week's approach from Heron Corporation.

The stumbling-block over last week's approach by Heron was its insistence that before making its £4.2m offer it would need to mount an investigation into the company's affairs taking seven days.

But ACC and Mr Holmes à Court told Mr Ronson and his advisers last Wednesday that if Heron were to make an offer it would need to do so by midnight, without conditions attached.

Heron was also expected to guarantee net debt at ACC of £50m, but before doing so, wanted more information about the group's affairs, and in any event was not prepared to do so before it took the company over.

It is understood that one of two leading banks have expressed concern about the position and the recent City rows and controversies surrounding the company, although it is not thought that any loans have been called in.

Mr Norman Ferguson, investment manager of the Imperial Group pension fund, an institutional shareholder in ACC voting shares, expressed annoyance yesterday about the offer for ACC by Mr Holmes à Court.

"If it is impossible to thwart Mr Holmes à Court's control of the company, our next move will be to see whether he can do something with the company and make it worth more than the Ronson offer," Representatives of the pension funds who have formed a special committee, plan to meet this week to discuss the developments.

Tomorrow, legal representatives of five ACC directors—

Lord Grade, Mr Louis Benjamin, Mr Norman Collins, Mr L. S. Michael, and Sir Leo Pridemore, as well as Mr Holmes à Court appear in court to defend an injunction sought by Mr Jack Gill, the group's former managing director.

His action against the ACC directors has been brought to ensure that he eventually receives his record payment of £560,000 in compensation.

The five directors signed an undertaking at a meeting of voting shareholders to place their voting shares, representing 45.3 per cent of the total, to support payment of the compensation.

Because of other action by institutional shareholders, who are seeking to block Mr Gill's payment through an injunction in the courts, the resolution for approval has never been put to shareholders at a meeting.

Mr Gill has now brought his action to prevent the shares of the directors named in the action from passing to Mr à Court as part of the bid deal, and to stop Mr Holmes à Court from registering the shares.

If the injunction is granted it could prevent the bid by Mr Holmes à Court from going conditional and the consequent question to Mr Gill is resolved. That will not take place until the outcome of the legal action of the institutional shareholders is known.

The institutions are going back to the courts on January 26 to seek a continuance of their interim injunction until the case comes before the courts in mid-February.

It is understood that the service agreement of Lord Grade has been renegotiated by Mr Holmes à Court. Should he retire or leave the group at any time, he will become entitled to a pension of around £45,000 to £46,000, and will be allowed to buy his home in London at cost. His share is thought to have been reduced from the £203,630 shown in the last accounts.

Mr Holmes à Court is understood to be actively considering the future ownership of Central Independent Television, in which ACC has a 51 per cent holding.

The Independent Broadcasting Authority has frozen ACC's voting rights in the boardroom of Central until the outcome of the bid is known and will require ACC to reduce its holding wholly or in part once the deal goes through.

Mr Holmes à Court, a non-resident, is disqualified by law from controlling a television franchise in the UK.

Men and Matters, Page 12

Hopes of solution to rail dispute hinge on Acas

BY CHRISTIAN TYLER, LABOUR EDITOR

A LONG-SHOT solution to the rail confirmation was being canvassed last night whereby British Rail would pay its train drivers the disputed 3 per cent in return for rapid negotiation and binding internal arbitration on the productivity issue.

The plan seems to depend on a move, possibly today, by Mr Pat Lowry, chairman of the Advisory, Conciliation and Arbitration Service. BR officials hope he may be persuaded to take soundings with the Associated Society of Locomotive Engineers and Firemen (ASLEF).

Even if the plan works, there seems little chance of preventing the drivers from striking again on Wednesday and Thursday. ASLEF leaders, bolstered by the verdict of Mr Len Murray, TUC general secretary, last Friday that BR is in the wrong, are digging in for a fight to the finish.

They will meet tomorrow to discuss stepping up the action in various ways and possibly calling a total strike.

Meanwhile the BR board also meets tomorrow. At the least, it is likely to decide that if next Sunday's strike goes ahead it will not pay the rest of the railwaymen even if they turn up.

It can do this because Sunday work is paid at overtime rates and is not covered by the industry's guaranteed week agreement—a guarantee of full-back pay that it would be legally difficult to dislodge.

BR had hoped that Mr Murray and Mr Lowry between them could sell the peace plan to ASLEF. Now the plan depends on whether Mr Lowry feels able to put Acas's neutrality at risk by taking the initiative when ASLEF says the industry's own procedure has been ignored.

Yesterday Mr Clifford Rose, BR member for industrial relations, said it would be "sensible" to talk to Acas again, and BR would respond to any overtures.

The dispute is over pay and productivity "understandings" reached at Aves last August in time to prevent a national strike. BR says a 3 per cent second-stage pay award

depends on prior commitments by the unions to accept flexible rostering—variable shifts of seven and to nine hours instead of the present normal eight.

If BR agreed to put the issue to the Railway Staffs National Tribunal, chaired by Lord McCarthy of Oxford University, it would be taking a gamble. In the past the tribunal has defended the unions' eight-hour day.

ASLEF claims to have solid support from its 27,000 members and sympathy from many railwaymen belonging to the National Union of Railwaymen despite the NUR's readiness to sign the flexible rostering agreement.

Last night, Mr Bill Ronsley, a senior ASLEF executive member, warned that the rail dispute could develop into a wider confrontation between the unions and the Government.

Calling Mr Murray's intervention a "very important contribution that put the whole thing in perspective," he added: "I think myself it is now clear that this is not just a question of productivity, but of Acas and the Board going out to destroy ASLEF. There is a feeling that Parker is acting on Government orders."

De Beers blocks UK statistics on Soviet diamond shipments

BY DAVID MARSH

DE BEERS, the South African mining company which dominates world diamond marketing, has blocked publication by the British Government of sensitive figures on shipments of diamonds from the Soviet Union to London.

Under the move, which affected Britain's trade statistics from the beginning of last year, the Government is no longer providing figures on clandestine shipments of Soviet diamonds to London, where they are sold through De Beers' worldwide marketing network.

The link in diamond markets between two countries, a sensitive end of the international political spectrum has been known for years. But it is not formally admitted by either side, and is a subject of considerable embarrassment particularly for the Russians.

The move effectively wraps another layer of secrecy around the highly discreet international trade in gold and diamonds, when the Soviet Union is struggling hard to raise funds in the West by boosting gold sales.

South Africa and the Soviet Union, the main world producers of both commodities, have been hard hit during the past year by weak prices. Last week De Beers announced a 45 per cent drop in diamond sales last year as it built up stocks to try to steady the market.

Britain's Customs and Excise denies that De Beers asked for the diamond statistics to remain unpublished and that it agreed to this.

In the 1970s the British Government took action to block statistics on gold imports into the London market, partly in response to Russian complaints made via the London bullion dealers.

The guarantee of discretion in London, together with some lessening of anonymity in Zurich, the rival trading centre, contributed to a Soviet decision last year to switch some gold shipments to Britain instead of Switzerland.

Most of the deliveries in London have mainly been rough unpolished stones which are passed on via a third party to De Beers and then sold through its Central Selling Organisation.

The CSO handles the marketing of about 80 per cent of the world's diamond production.

Russian shipments to the UK normally run into several hundred million pounds a year. Following Soviet foreign exchange shortages, the deliveries are thought to have contracted at last year's rate last year in spite of the weakness of the diamond market.

But no proper figures are available because at the beginning of last year Britain's Department of Trade stopped publishing figures for Russian gems

sent to London for transshipment.

The Department defended the action—which affected all diamond exports and imports for last year—on the grounds that it removed a distortion of the trade figures. It also made a similar move on aircraft shipments last year, for the same reason.

Asked to provide the missing figures, the Customs and Excise—which is responsible for collecting the figures—declined to do so because it would identify the trading position of De Beers. "The trader was consulted about the possibility of publishing the figures," the Customs and Excise said last week.

For several years up to 1980, Russian diamond shipments to London made up the lion's share of imports from Moscow under the Trade Department's opaque heading "non-metallic mineral manufactures." These came to £202m in 1978 (out of total imports from the Soviet Union of £688m), £335m (total £828m) in 1979 and £267m (total £756m) in 1980.

Last year, however — for which only four months' figures are available because of the civil servants' dispute — the identified imports dropped dramatically to only about £100m a month because of the changed statistical coverage.

CONTENTS

U.S. telecommunications: squaring up for a fight 12
De Lorean: why it wants more 13
Technology: specialised power units 8
Management: Air Zimbabwe 10
Lombard: Samuel Brittan on a new kind of competition 13
Justinian: expanding the prosecutor's role 9
Editorial comment: competition and the banks: understanding Germany 12
Survey: Computer Industry Inset

Acts 11
Appointments 7
Base Rates 7
Building News 2
Bus man's Day 7
Company News 14
Crossword 11
Entertain. Guide 11
Euromarkets 22
Financial Diary 7
Insurance 7
Int. Cap. Markets 13
Lep. 15
TRU and Bids 22
Labour 5
Leaders 12
Management 11
Men & Matters 10
Money & Exchngs. 18
Overseas News 2
Parliamentary Diary 7
Share Information 20-21
Technology 8
TRU and Bids 22
UK News 3-5
Unit Trusts 19
Weather 22
World Econ. Ind. 2
World Stock Mkts. 17
World Trade 2

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OVERSEAS NEWS

Sharon poised to begin talks on Sinai withdrawal

BY ANTHONY McDERMOTT IN CAIRO

MR ARIEL SHARON, Israel's Defence Minister, arrived in Cairo yesterday for negotiations which will concentrate on the details of Israel's final withdrawal from Sinai.

There are signs that last-minute hitches could develop over the removal of Israeli equipment and the status of two islands at the entrance to the Gulf of Aqaba.

Egypt is demanding that the withdrawal should be completed on schedule as agreed in the Camp David accords and the peace treaty with Israel.

The daily newspaper Al-Gumhuriya has been recording the countdown to the withdrawal on its front page. Yesterday, it said: "After 97 days, Israel withdraws from Sinai."

Mr Kamal Hassan Ali, Egypt's Foreign Minister, was quoted yesterday as saying that not one Israeli would be left in Sinai on April 26, the day after the withdrawal is to be completed.

This presumably was a retort to a statement by Mr Sharon on January 15 that he would ask Egypt to be flexible over the deadline because some equipment needed dismantling.

He was referring to equipment near Israel's border, and said that Israel did not want to leave behind anything which

might be used as the basis of a population centre.

Another problem has arisen over the status of two islands—Tiran and Sinafir—which lie at the mouth of the Gulf of Aqaba at the head of which lies Eilat, Israel's sole southern port. The blocking of the Gulf helped to precipitate the 1967 war.

The two islands are under Saudi sovereignty, as State Department officials in Washington recently acknowledged, but were leased to Egypt in 1954. They have twice been captured by Israel in fighting with the Arabs in 1956 and 1967.

Israeli newspapers have reported that Saudi Arabia is ready to reclaim these islands after their return to Egypt.

Egypt maintains that under the terms of the 1979 peace treaty they would be patrolled by Egyptian civilian police.

Israel, which has had border difficulties with Saudi Arabia and is also concerned about the build up of military equipment in the Kingdom, is asking for a commitment from Egypt that they would not be returned to Saudi Arabia.

Israel is also asking that the international peace-keeping force being set up to patrol Sinai, should be placed on the islands.



President Zia: seeking further support

Zia starts four-nation tour

PRESIDENT ZIA UL-HAQ of Pakistan yesterday arrived in Italy at the start of a visit to four European countries, Rupert Corwell reports from Rome. The purpose of Gen Zia's tour is to bolster support for his regime as a bulwark against Soviet expansion in southern Asia.

Gen Zia is accompanied by six members of his Government including Mr Aga Shahi the Foreign Minister. He is expected to press the Italian Government for economic and humanitarian aid to help cope with an estimated 1.5m Afghan refugees. Italy may also be requested to step up general financial and military assistance.

Gen Zia is later to visit Romania, Yugoslavia and France.

Emergency ends

A state of emergency, imposed in Sri Lanka five months ago by President Junius Jaywardene, has been lifted, Reuter reports from Colombo. The emergency was declared to enable the Government to deal with violence between the majority Sinhala and minority Tamil communities.

India strike warning

India's Home Minister, Mr Zail Singh, said last night that a one-day general strike called for tomorrow was politically motivated and an attempt to weaken the Government, Reuter reports from Delhi. The strike has been called by some opposition groups and trade unions, partly in protest against new powers enabling the Government to ban strikes in essential services.

Tanker attacked

Philippine officials are investigating an attack on a Japanese chemical tanker by two unidentified fighters, east of Mindanao island, AP reports from Manila. The incident is reported to have occurred on Friday when the Hegg, 5,307 tons, was en route to Pusan, South Korea, from Singapore.

FRENCH NATIONAL PLANS

Delay will be keenly felt by Mitterrand

BY DAVID WHITE IN PARIS

AFTER six months of gestation, marked by a long, complex and bitter debate, the third sweeping nationalisation programme in French history was to have seen the light of day this week.

Instead, the forecast, now that the Constitutional Council has had its say, is for a fresh period of uncertainty. An abortion is out of the question; the Council has not asked for one, and President Mitterrand's Government has made it absolutely clear "there is no going back."

But large question marks now have to be put against two aspects of the Bill, which the National Assembly approved a week before Christmas: its cost which will certainly rise as a result of the Council's rejection of the compensation terms, and its timing.

It is doubtless the delay—which could be months rather than weeks—that the Government feels most keenly. The enlarged public sector is crucial to the Government's ambitions for growth and employment.

Putting a brave face on it, the Government can at least

pride itself on the fact that the Council has let pass the main political aspects of the Bill, as well as the basic method of compensating shareholders by giving them long-term state bonds.

None of the names on the list, has been challenged. The Government can therefore go ahead with nationalising the five industrial groups, the 36 banks and the two giant holding companies, Compagnie Financière de Suez and Compagnie Financière de Paris et des Pays-Bas, which have powerful stakes in both banking and industry.

The remainder of the nationalisation programme is not affected by the Council's decision: the acquisition of majority stakes in the two arms groups, Matra and Dassault (already fait accompli), and the renegotiation of arrangements for three groups in which foreign multi-nationals have the biggest shareholdings (which is still going on).

Opponents of the Bill, in Parliament and outside, have lost on several key points. The Council accepted, besides the

Government's right to nationalise, the setting of a threshold for banks on the list (deposits of FF1 bn and over) and the authorities' interpretation of laws regarding equality of treatment and extra-territoriality.

The Government is challenged on three points, two of them relatively minor. It wanted to exclude co-operatives from the banking takeover. The Council says it must be fair, nationalise co-operative bodies that correspond to the other banks being nationalised.

This is expected to involve adding three banks to the list: Banque Fédérative du Crédit Mutuel (a subsidiary of the large Crédit Mutuel group), Banque Centrale des Co-opératives et Mutuelles and Banque Française du Crédit Co-opératif.

As a precaution in case foreign partners created trouble, the Government had put in a clause giving chairmen of nationalised companies discretionary powers to sell off holdings in foreign companies. This has now been barred, in the

same way that the Government was earlier forced to drop a clause providing for the sale of some interests back to the private sector.

The Council's decision probably means that the Government would have to go through Parliament to sell any of these interests.

The big problem is compensation, and is made worse by the lack of any alternative suggestion from the Constitutional Council.

The Government already adjusted its formula in September, bowing to the opinion of another official non-Government body, the Council of State, which has purely advisory powers. Improving its conditions for compensation—limiting not only past share prices, but also past profits and non-consolidated assets—decided in exchange to let pay dividends for 1981.

Criticised for not making provisions for inflation (the base years for share prices and profits being 1978, 1979 and

1980) and for not including assets of subsidiaries, Government now has to go to the drawing board.

The payment of 1981 dividends alone is expected to be between FF1.15bn and FF1.2bn to the companies, estimated by the Government at FF1.2bn (€2.4) including interest payments under the original formula.

The Constitutional Council, by demanding a further improvement, has exposed it to a row about its role as institution and about the duties of its members, appointed nine-year terms by the President and the Speakers of two Houses of Parliament.

After the Government rejected a new compensation formula through Parliament, the only way to stop the opposition is to return to the drawing board for a final working out of the law for the 1982 session. The Government is at this time almost certainly for an urgent one-week deal. If that decision were again even greater authority is the

Polish loyalty pledges may stop

BY CHRISTOPHER BOBINSKI IN WARSAW

THE POLISH authorities may stop forcing people to sign loyalty pledges as a condition for keeping their jobs, according to officials of the Church.

Speaking in a Warsaw church over the weekend, Archbishop Jozef Glemp, the Polish Primate, again attacked the Government policy of extracting pledges. He also expressed concern that arrests were continuing. "We hear about further arrests when there are so many people interned awaiting release," he said.

He appealed for unity in the nation and a "change of heart" to make that possible. "The Church wants to bring our nation together."

At today's meeting of the Church-State mixed commission, the first due to be held since martial law was declared, the government's agreement to drop its policy on loyalty pledges would be construed as a concession to Church demands.

But the military government is not expected to extend its concession to include the government administration, where union membership has been forbidden. A legal and binding professional code for the civil service may be drawn up, amounting to a loyalty pledge.

It remains to be seen, in any case, whether the government's promise to drop the insistence on pledges will reduce victimisation of Solidarity supporters. The Church-State commission is headed by Cardinal Franciszek Macharski, Archbishop of Krakow, and Mr Kazimierz Barcikowski, a member of the Politburo and one of General Wojciech Jaruzelski's closest

The Pope has condemned the division of Europe at Yalta into two post-war spheres of influence whose shadow lies over the military clampdown in his native Poland, writes Rupert Cornwell in Rome.

Although the Pope has emphasised the right of nations—not only Poland—to full sovereignty, this was the

first time he had criticised directly the existence of two opposing blocs in Europe.

His comments were coupled with harsh criticism of the military regime in Warsaw. In his traditional audience for foreign ambassadors to the Holy See, the Pontiff said Poland was in "a state of war."

the priest quoted from the letter of Ryszard Traugott, executed as a leader of the 1963 uprising against Tsarist Russia.

Meanwhile, Poland's troubles have been compounded by the flooding of 24,000 hectares of land.

In addition, the party newspaper, Trybuna Ludu, said over the weekend that sales of grain by farmers to the state had not risen appreciably in the last month.

A further indication, albeit symbolic, that the government is striving for a return to surface normality, is the decision to allow the army's guard of honour to parade yesterday in traditional four-cornered hats.

The four-cornered hats were part of Polish army uniform in the last century and survived until they fell victim of Warsaw Pact uniformity and made way for rounded hats. The return to the old style for the Sunday changing of the guard at the monument to the unknown soldier is a modest gesture to nationalist sentiment.

Economic committee reviews price rises

BY OUR FOREIGN STAFF

THE POLISH Government is reviewing its decision to increase the prices of essential goods and services by as much as 400 per cent and may also change its proposed system of compensatory pay rises. "The changes will be presented to the public as soon as possible," the official PAP newsagency reported.

The government's economic committee, presided over by Mr

Janusz Obodowski, is implicitly acknowledging public opposition to the planned rises. Despite the existence of martial law, the Government is mindful of the violent unrest caused in 1970 and 1976 as a result of major price increases, especially in essential foods.

The economic committee declared after its meeting: "It is generally considered that the

proposed heating and energy charges are too high."

The Government originally stated on December 31 that the prices of food, consumer goods and services would increase two-fold to fourfold. Sugar, for example, was to rise by over 400 per cent.

According to PAP, the proposed system to compensate for the increases had caused contro-

Early talks on one-party Zimbabwe

By Our Salisbury Correspondent

ZIMBABWE'S Prime Minister Robert Mugabe, renews his intention at the weekend press ahead with the implementation of a one-party state. He also repeated his Government's commitment to "Zimbabweanisation" of the economy.

Speaking near Salisbury Saturday, Mr Mugabe said Government planned to aim greater control of the mining, industrial and farming sectors thereby ensuring increased involvement by blacks. Mugabe was speaking in Salisbury and his remarks were reported in yesterday's Sunday Mail which quoted him as saying political power was meaningless without economic control.

"Before we have control of our mines and farms and commerce and industry we have no power," he said.

Part of his programme would be to discourage business from making huge profits at the expense of the aid of the workers.

The Government wanted to achieve a position in more businesses were run by workers but Mr Mugabe said: "We will not take business forces. We will buy whatever we can afford."

Where organisations taken over, they would be handed over to the workers. At another rally yesterday, Mugabe announced that level talks would take place between the two parties, the ruling coalition to be about a one-party state.

WORLD TRADE NEWS

KWU looks set for £190m generator deal with S. Africa

BY BERNARD SIMON IN JOHANNESBURG

KRAFTWERKUNION (KWU) of West Germany, a subsidiary of Siemens AG, has signed a letter of intent with South Africa's Electricity Supply Commission (Escom) for six 600 MW turbine generators at the cost of R350m (£190m).

The generators are for the new Kutala power station to be built at Kendal, 80 miles east of Johannesburg.

The Kutala turbine contract is the last of a series of boiler and turbine orders totalling almost R4bn placed by Escom over the past two years for four large coal-fired power stations. Boilers for the Kutala station will be supplied by Combustion Engineering of the U.S.

A KWU official said financing details for the turbines had not been completed. Decisions still have to be taken on the propor-

tion of local content. German banks are likely to play a key role in the financing. The Bonn Government has lifted restrictions on export credit guarantees for South Africa to enable German companies to tender. German suppliers, including L and C Steinmuller and MAN will participate in no fewer than six of the eight recent boiler and turbine contracts.

European mission boosts India ties

By K. K. Sharma in New Delhi

HIGH-LEVEL talks between India and the EEC will begin today when a delegation led by Herr Wilhelm Haferkamp, vice-president of the European Commission, arrives for a 10-day visit.

The talks will be held in terms of the recently signed, five-year commercial and economic co-operation agreement between India and the EEC.

The new Indo-EEC joint commission also will meet in New Delhi on January 22-23. Later, the EEC delegation will hold talks with major chambers of commerce and industry in New Delhi, Bombay and Calcutta.

Herr Haferkamp and his delegation will discuss with India's Commerce Minister, Mr Pranab Mukherjee, ways to promote economic co-operation, trade, EEC investment in India and project aid. One of the proposals to be discussed is establishment of an EEC-India business council.

A filip to Indo-EEC relations, which have been increasing at a slower pace than those with other countries and regions is expected to emerge when a permanent EEC mission is set up in New Delhi.

The agreement replaces the five-year commercial co-operation agreement signed in December, 1973. This was confined to trade whereas the new pact covers a much wider area of economic, financial and investment activities.

Mexico signs nuclear safeguards agreement

BY WILLIAM CHISLETT IN MEXICO CITY

MEXICO AND Canada have signed a nuclear safeguards agreement under which Mexico has agreed to abide by the rules of the Vienna-based International Atomic Energy Agency.

The agreement was signed at the end of the three-day official visit to Mexico by Mr Pierre Trudeau, the Canadian Prime Minister.

The signing of the agreement came two weeks before Atomic Energy of Canada, the country's state run nuclear

company and six others from the U.S., France, Sweden and West Germany are due to submit tenders for a nuclear power plant in Mexico.

King Carl Gustaf of Sweden arrives in Mexico City today with a team of businessmen also in pursuit of the nuclear contract.

The contract, worth more than \$2bn (£1,060bn), is the first stage in Mexico's massive nuclear power programme to install 20,000 Mw by the end of the century.

Canada is probably the toughest country in safeguard matters and the fact that it has foregone a more formal agreement emphasises the intense competition building up for the contract.

Canada is offering its Candu system based on natural and not enriched uranium which is viewed favourably by the Mexican Government because Mexico has its own sources of the metal. The country would therefore not have to depend

on a foreign source enrichment.

Canadian officials given no indication that Canada system would be picked. Mexico will not make an announcement until August.

Mitel communications Ottawa and Telephones Mexico, the state run phone company have agreed to establish an \$18m venture to manufacture telephone switching systems.

Canada awaits contract decision

BY DAVID FISHLOCK

THE STRONGEST argument in the portfolio on Candu presented by the Canadian Government to Mexico during Mr Pierre Trudeau's visit there last week was probably the performance of this nuclear reactor in Canada itself.

The Candu (Canadian Deuterium Uranium) reactor is a Canadian development born of an Anglo-Canadian-French collaboration which began towards the end of the Second World War. France supplied the basic idea for a heavy water reactor which would use natural (unenriched) uranium, avoiding a big technical hurdle.

But the need to enrich water instead of uranium—to make heavy water—introduced another technical problem. Both France and (much later) Britain abandoned the system, leaving Canada as the only nation in the world to focus exclusively on a heavy water reactor.

Today, Canada has 5,500 Mw of Candu nuclear plant in operation, and a further 14 units totalling 9,500 Mw under construction in the provinces of

Ontario, Quebec and New Brunswick. It has two standard units of 600 Mw and 950 Mw electrical output.

Candu differs from other commercial reactors in that it uses numerous small pressure tubes instead of a single large pressure vessel, to contain the conditions required to raise high-pressure steam for a large turbo-generator. Its fuel is uranium dioxide, sealed into about fuel assemblies packed into these tubes.

The pressure tubes themselves pass horizontally through a large tank of heavy water, which serves as moderator for the nuclear reaction. Fuel can be loaded and unloaded by robot machinery while the reactor remains on-load.

Candu continues to perform better than most other types of reactor. In its annual presentation to the International Atomic Energy Agency in Vienna last autumn, the Canadian Government claimed that, by the end of 1980, the system had demonstrated a lifetime average capacity factor of

77 per cent — "the highest any reactor type in the world."

Top of this league in was the Bruce 2 unit (800 Mw) with a capacity factor close to 95 per cent. "Even allow for the notorious difficulties comparing international figures," Canadian officials asserted.

Mr James Donnelly, president and chief executive officer of AECL, in his annual report, claimed there was good evidence of the suitability of Candu for many countries.

continued evidence of systems' superiority and growing overseas experience the construction of Candu stations have stimulated world interest. "Especially encouraging was the fact that countries such as Romania and South Korea were expressing interest in buying more."

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SHIPPING REPORT

Hint of optimism for dry cargoes

BY ANDREW FISHER

WHILE TANKER business remained sunk in gloom, there were faint signs of improvement on the dry cargo side of the shipping market last week.

According to Denholm Coates, there was reason for modest optimism for the first time in many weeks for the owners of handier size (25,000-40,000 deadweight tons) bulk carriers in the Pacific.

Increased business enquiry on the U.S. West Coast and in Australia has resulted in a few higher-priced chartering fixtures and a distinct lift in morale.

For larger tonnage, the East remains weak. But across the Atlantic, rates for grain cargoes from the U.S. Gulf to continental Europe have risen to \$10.25 a ton.

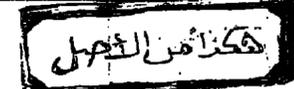
For handy size vessels, there was only a modest recovery on the U.S. Gulf-Japan run with rates up to \$19.25 a ton against lows of around \$18.35.

braith Wrightson, has been just "limping along." No large vessels were fixed from the Arabian Gulf, while only three fixtures were noted from West African terminals.

There were more Caribbean fixtures, but rates remained sluggish. More fixing for discharge in Europe was seen, no doubt due to the cold weather in Europe.

World Economic Indicators

	INDUSTRIAL PRODUCTION				% change over previous year	Index base year
	Nov. '81	Oct. '81	Sept. '81	Nov. '80		
U.S.	146.5	149.6	151.7	149.2	-1.8	1967=100
UK	105.4	103.4	103.5	103.3	+2.0	1975=100
W. Germany	116.6	115.9	116.6	115.4	+1.0	1975=100
France	112.6	112.1	111.1	114.9	-2.0	1975=100
Italy	120.9	125.8	116.0	125.4	-3.6	1975=100
Japan	151.7	147.2	143.7	143.1	+6.0	1975=100
Netherlands	107.4	109.0	112.9	106.7	+0.7	1975=100
Belgium	112.9	110.7	108.4	111.0	+1.7	1975=100



# Rates row looms as MPs return

BY ROBIN PAULEY

MPs return to Westminster today and immediately plunge into controversy with the second reading of the Bill to ban supplementary rates, which has attracted growing criticism during the recess.

The Local Government Finance (No. 2) Bill will allow councils to fix a rate as high as they like in March but will prevent any second rate being levied during the financial year.

It replaces the first Bill, which would have limited the main rate call, and forced councils to hold a referendum before they could levy a rate beyond a centrally determined limit.

This proposal had to be withdrawn when backbench Tory MPs indicated they would block its passage through Parliament because of the constitutional implications of referendums.

But two aspects of the new Bill have caused growing concern among MPs, local authorities and accountants. The first is clause 4, which allows the

Secretary of State to alter the amount of central government grant payable if he wants to at any time in the financial year. This means that a council which the Government feels is overspending could lose some grant as a penalty after the start of the financial year. It would no longer have the right to choose whether to make up the loss by returning to the ratepayer or by making cuts.

Unless it had substantial balances on which to draw, it would be forced to make cuts. This would mean the Government was controlling rather than influencing council spending.

A number of MPs on both sides of the House feel the constitutional implication would be the turning of local government into controlled local administration if this power was used in only one case.

Some Whitehall sources say the Government does not intend to use such a power and would

placate by the same rules as councils had to obey—making all decisions by March 31. But the refusal of Mr Michael Heseltine, Environment Secretary, to clarify his intentions over clause 4 is causing growing concern.

Unless he can satisfy MPs during today's second reading debate a move may be made this week to have the Bill taken to a special scrutiny committee before the committee stage.

This provides for evidence to be taken in a maximum of three 90-minute sessions, enabling access to Bills before they become law but not holding their progress up unduly.

Mr Heseltine could then be called to give evidence on clause 4. One problem is that Mr Francis Pym, Leader of the House, does not like the idea and has already said there are no "suitable Bills" for its use.

The second difficulty with the Bill concerns the plan to establish an Audit Commission to

allocate an auditor to local councils from either the public or private sector. The Bill leaves the Secretary of State with reserve powers to order an extraordinary audit of any council even if the Commission has decided not to call one.

Public and private sector accountants are working on a common approach to oppose this clause, which they feel threatens the independence of audit.

About 300 MPs have signed an early day motion urging an alternative, originally proposed by the Public Accounts Committee, giving ultimate control of public sector audits and accounts to Parliament.

Tory-controlled Southill Council will today challenge in the High Court the cheap fares policy of the Labour-controlled West Midlands County Council. West Midlands is financing its public transport charges with a 14p in the pound supplementary rate.

# Strains on Labour peace pact likely

By Our Political Correspondent

STRAINS in the Labour Party's new truce seem likely to emerge when MPs return to Westminster today and start trying to pin down precisely what was agreed between Labour and union leaders at Bishops Stortford two weeks ago.

Though the desire for peace in the Labour Party is now wider than at almost any point in the past two years, some right wingers may refuse to accept the terms which the far Left is trying to put on the peace.

Members of Solidarity, the organisation set up last year to counter the activities of leftwing militants in the party, are to meet this week to consider their strategy in the light of the Bishop's Stortford meeting.

In particular, they will have to decide whether to press ahead with plans to imitate the Left's own tactics.

Though no formal agreement was reached at Bishops Stortford, the meeting was generally interpreted as meaning that Mr Tony Benn would not stand for the deputy leadership again, if the Right did not try to reverse any of the gains made by the Left since the election.

An indication of the desire for peace came yesterday when leftwingers moved to defuse a potential row over an article by Mr Michael Foot, the party leader, which was highly critical of Mr Benn. At least one close colleague of Mr Benn, Mr Michael Meacher, said he saw nothing provocative in the article.

# Car transporter companies face monopoly investigation soon

BY DAVID CHURCHILL, CONSUMER AFFAIRS CORRESPONDENT

CAR TRANSPORTER companies, which deliver cars from manufacturers to the showrooms, are expected to be investigated by the Monopolies and Mergers Commission soon.

Mr Gordon Borrie, director-general of Fair Trading, has written to major car manufacturers such as BL and Ford as well as the five main car transporter companies, telling them that he plans to refer the car transport system to the commission.

The investigation will be a monopoly inquiry under the terms of the 1973 Fair Trading Act. Mr Borrie's letter to the companies outlines the draft terms of reference for the investigation and asks for comments. Once these have been received the investigation will be formally referred to the commission.

The proposed investigation

arises from concern about the price levels of cars transported from UK car plants compared with the cost of transporting imported cars from the docks.

The commission will also be asked to look at the degree of competition between companies in the industry and whether discounts are offered according to the distance a car is transported.

The five car transporter companies contacted include: Silcock and Colling; Distributor Deliveries; the Tolmans Group; R. K. Bastable; and Cartransport, a subsidiary of the National Freight Company.

The Office of Fair Trading has written to BL, Ford, Talbot, and Vauxhall and to organisations such as the Motor Agents Association and the Road Haulage Association advising them of the impending inquiry.

The Office of Fair Trading

yesterday confirmed that it had been examining the car transporter sector but was unable to comment on a possible monopoly inquiry. But the commission's investigation — when announced — is likely to take up to 18 months.

Mr Graham Roberts, managing director of Cartransport, said yesterday he was surprised at receiving the proposed monopoly reference from the OFT.

During the past five years over a third of all the vehicle delivery contracts have changed hands and several newcomers to the industry have been able to secure significant business," he said.

The commission is concluding its investigation into the supply of car spares in the UK. This investigation is likely to end in May.

# Architects propose £1bn spending boost

BY PAUL HANNON

THE ROYAL Institute of British Architects today submits proposals to the Government for revisiting the UK construction industry.

RIBA's primary proposal to the Chancellor, for inclusion in the forthcoming Budget, calls for a capital spending increase of £1bn on inner city development, housing improvement and upgrading of road, water and sewerage services.

Grants to assist first-time buyers in raising house deposits could be met from such a sum. The institute claims that with unemployment in the industry at 400,000, output down by 17

per cent since the Government took office and architect's commissions 26 per cent lower, it is time for drastic action.

The proposals include doubling the initial allowances for industrial buildings and a 12-month tax break on development land in the inner cities, which would speed the release of new land for building.

Other proposals submitted include:

- A reduction in interest rates.
- Zero-rated VAT on repairs and maintenance. This would greatly assist listed buildings and generally improve the quality of the nation's housing

stock.

- Increase the lower limit for VAT registration to £25,000
- Raise the threshold at which stamp duty is payable from £20,000 to £25,000.
- Wider use of government guarantees to financial institutions, which would encourage private investment in high-risk areas such as inner cities.

An increase by £1bn in government spending on construction would enable the industry to achieve a modest growth rate of up to 2 per cent in 1982/83 compared with a forecast 3 per cent contraction in output in 1982. RIBA argues.

The additional spending could increase employment in the construction industry by 130,000, the Institute says.

"The Government's broad strategy has been based on the expectation of a reduction of public spending with a corresponding increase in private sector activity. The latter has not occurred," Owen Luder, RIBA president, claims.

"The Royal Institute believes that by making use of some of the tax measures proposed, the Chancellor can encourage badly needed confidence and growth in the economy."

# Analysts forecast modest recovery in OECD states

BY ROBIN PAULEY

ONLY A modest pick-up in economic activity in OECD States is forecast for this year by Phillips and Drew, brokers and investment analysts. But inflationary trends will moderate and gnp growth will be better in Europe than the U.S. in the New Year issue of World Investment Review published today Phillips and Drew argue that the economic prospects for the year in major industrialised nations will be heavily influenced by the replacement of the 1980-81 oil-induced recession by a policy-induced recession, as opposed to the "boom" policies pursued in 1975-76 after the first oil crisis.

The paper predicts real gnp growth of only 0.2 per cent in the U.S. in 1982 compared with nearly 2 per cent last year. Although Europe may do better with economic activity rising 1.6 per cent in West Germany, 1 per cent in Britain and 2.2 per cent in France, the growth rates are well below the average rates of the 1970s.

Inflation predictions are 7 per cent for the U.S. and about 4 per cent in West Germany and

Japan. The paper is among the few which still regards single figure inflation as probable — or even possible — in 1982 in Britain.

The analysts say currency movements are likely to be determined by the interplay of interest rate differentials and current account performances. They predict a deterioration in the U.S. current account, a smaller surplus in the UK (although some analysts fear the UK account could be in deficit by the year end) and strong improvement in West Germany and Japan.

They predict a fall in U.S. interest rates in the first half of 1982 as economic activity reaches a low but the combination of high government borrowing and some economic recovery are likely to push U.S. rates back up later in the year says the review.

Brokers James Capel take a similar line in their International Board and Currency Review, predicting a short-term fall in U.S. interest rates, also a short-term recovery in sterling followed by a decline in the second half of the year.

# Lower power costs 'might have saved Invergordon'

BY ANTHONY MORETON, REGIONAL AFFAIRS EDITOR

BRITISH ALUMINIUM'S Invergordon smelter in the Scottish Highlands would have been competitive in the European market had it received electricity at the same price as that being paid by the two other large UK smelters.

That claim was made yesterday by Rear-Admiral David Dunbar-Nasmith, chairman of the Highlands and Islands Development Board.

British Aluminium announced the closure of the smelter on December 29. The shutdown cost 890 jobs directly and could cause another 600 jobs to be lost.

At the time of the closure, Mr Ronnie Utiger, British Aluminium's chairman, laid the blame squarely on high power costs. A special power contract had been arranged through the government, but electricity prices had led to the smelter operating uneconomically according to the company.

The Invergordon smelter was one of three set up in the late 60s under the auspices of Mr Harold Wilson's Labour Government to try to reduce the country's dependence on imported aluminium. The other two are at Lynemouth in

Northumberland (run by Alcan) and Holyhead in Anglesey (now owned by Kaiser Aluminium and Rio Tinto-Zinc).

Admiral Dunbar-Nasmith said yesterday that research commissioned by the Highlands and Islands Development Board before the Invergordon closure was announced strengthened the case for continuation of production if the price of electricity were right.

Significant improvements could be made at the smelter to improve its operating efficiency and reduce costs. The board was also advised that the world price for aluminium was likely to increase from 1983 and to "improve significantly from 1986."

If the Scottish electricity generating authorities cannot supply electricity to a smelter in Scotland at the same price as a smelter can be supplied in other parts of the UK then something needs to be done about it since the English and Scottish grids are joined together," he said.

Availability of hydro-electric power in the Highlands should also be a major consideration, Rear-Admiral Dunbar-Nasmith said.

# 737 take-offs order

BY ANDREW FISHER

British airlines with Boeing 737s—similar to the aircraft which crashed in Washington last week—have been ordered to increase take-off speeds in icy weather.

The Civil Aviation Authority (CAA) sent out a letter to the six British companies which operate 737s on "ridays", stating that take-off speeds must be raised by between two and five knots in cold temperatures.

The directive follows lengthy discussions on the

performance of the 737 aircraft in icy conditions. There have been several incidents which prompted these talks and the CAA order.

The CAA said the directive had been in preparation for some time and its appearance just after the Washington crash which killed over 70 people was a coincidence.

The airlines affected by the CAA directive are British Airways, Britannia, Monarch, Air Europe, Orion and Dan Air.

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UK NEWS

Two Hull trawlers sold to New Zealand

By Richard Mooney

BRITAIN'S two biggest and most successful trawlers have been sold to a New Zealand company because of the dramatic decline in fishing opportunities for the UK deep sea fishing fleet.

Arctic Buccaneer and Arctic Galliard, both operated by Boyd Line of Hull, have been bought by Fletcher Fishing of Auckland. This reduces the Hull deep sea fleet, which was 46 in 1974, to 14. The total deep sea fleet, which exceeded 500 vessels in 1974 is now fewer than 90, and many of these are not active. Morg ships from the Hull fleet may be sold to join similar ships in offshore oil operations in various parts of the world.

Boyd Line had offers for the vessels from British buyers, but these would have meant their being taken out of the fishing industry. The company preferred to sell them to Fletcher Fishing, which has also offered two year contracts for a small management team and 60 Humber-side trawlermen who will accompany the vessels. The ships will fish out of Auckland.

Mr Tom Boyd, managing director of Boyd Line, said: "They are the last vessels we would wish to sell but we are being forced to. We need the cash to clear some of our debts and try to keep what we have left going. Unfortunately they are our best assets and with them goes some of the nation's best assets as they will be accompanied by management and crews also trying to find the sort of future which is being snatched away from them in their home waters."

"It's madness. We are forced out of business while Russian factory ships and Dutch trawlers make a profit from British fish."

In 1978 Arctic Buccaneer set a British catching record, previously held by Arctic Galliard. This record still stands. Today a delegation of trawler owners will meet Ministry of Agriculture and Fisheries officials for talks on the industry's problems. They will seek additional aid, following the £20m of special assistance granted to the industry last year.

How London adds to the cashflow on world black markets

David Marsh looks at the booming trade in foreign banknotes

LONG-DISTANCE UK lorry drivers setting out for the Continent are apt to pack wads of DM 100 banknotes into their wallets to pay for deliveries being picked up in Hamburg or Düsseldorf.

British enthusiasts seeking to buy their cars at cheap prices through dealers in Brussels at times last year bought so many Belgian francs through London banks that tellers ran into supply shortages.

Diplomats and aircrew from countries with shaky local currencies make highly profitable trips to their capitals with bundles of banknotes bought cheaply in London.

All this is part of a business which used to be the preserve of enterprising Continental centres like Zurich but is now booming in London—the twist being that bills are settled in cash to avoid registration by tax or other authorities — has also encouraged banknote dealing.

The London market is focused on the clearing banks plus a cluster of wholesale banks like Trade Development Bank and Brown Shipley. The big dealers are served by the myriad collection of bureaux de change which has sprung up on street corners in the past few years.

British banknote dealing has grown considerably since the ending of exchange controls in October 1979. This allowed British residents to dabble in foreign currencies for the first time since before the war.

A further influence on the market is the increase in foreign travel. International expansion of illicit or "black" economy— in which bills are settled in cash to avoid registration by tax or other authorities — has also

encouraged banknote dealing. One major London clearing bank has expanded its note trading department since 1979 from six to 22 dealers.

Political instability in a range of countries has prompted currency outflows, leading to a thriving external black market in their currencies.

Most holiday countries apart from mainstream western Europe and North America maintain some sort of restriction on the amount of local currency that can be exported or imported.

Governments in countries ranging from coup-ridden parts of west Africa to Greece, Spain or even Scandinavia want to avoid the foreign exchange strains that can result from a

large pool of local currency being built up abroad.

The gap between the official exchange rate at home and the often much lower rate quoted abroad acts as a barometer of the country's financial and economic stability.

Unscrupulous operators — frequently diplomats misusing their immunity from customs searches — can make large profits by buying up banknotes cheaply abroad and smuggling them back into the home country. There they can be changed at a much higher rate.

One bank speaks of regular custom from an African diplomat making frequent currency smuggling trips to Moscow. Contraventions of regulations can lead to stiff fines or even

imprisonment for unwitting holidaymakers and professional smugglers alike.

None the less, in recent weeks currencies like the Maltese pound and the South African rand have fallen to a steep discount on the external market because of persistent outflows.

The Maltese pound, for instance, can be bought in London at 0.80 to the pound and sold at 0.50 — against the official rate of 0.75.

Not surprisingly, the biggest loser in recent weeks is the Polish zloty for which the foreign banknote market is very thin. The rate is about 3,000 to the pound against the official value of 150.

Large denomination bank-

notes are often quoted at the lowest prices abroad precisely because it is these which domestic authorities restrict from being re-imported. The price gap between large and small denomination Greek drachma notes rose recently to as much as 28 per cent.

Banks and travel companies particularly advise holidaymakers against returning home with large denomination notes. Even from countries like Italy, Norway, Portugal, Sweden, Spain and Iceland, such notes can be re-exchanged only at a loss.

When banks sell customers foreign banknotes in amounts above those legally allowed to be imported into the country

concerned, they usually ask the purchaser to sign a disclaimer showing that he has been made aware of the regulations.

Travel agents have plenty of stories about holidaymakers who fall foul of currency laws spending a few days in decidedly cramped accommodation with views restricted by iron bars across the window.

Sometimes banks build up large stocks of illegally imported banknotes for which they cannot find customers.

In these cases they may arrange a deal with the foreign central bank concerned to repatriate the currency at a discount. It can happen, though, that the central bank takes the currency back only on condition of receiving names and addresses of the customers who brought in the money.

Call for guard against nuclear weapon increases

BY DAVID FISHLICK, SCIENCE EDITOR

THE INTERNATIONAL nuclear industry must not be tempted by lean times to undercut competitors in safeguards against nuclear weapon proliferation, Dr Hans Blix, newly appointed director-general of the International Atomic Energy Agency, has warned.

Dr Blix also wants more support from the nuclear industry for international safeguards, and for his efforts to harmonise nuclear safety.

Interviewed in London, where he is on his first state visit since his appointment late last year, Dr Blix said he regards nuclear safeguards and nuclear safety as promotional rather than regulatory activities.

Without them, there could be no significant international trade in nuclear plant and materials.

Dr Blix has talked to Lord Carrington, Foreign Secretary, and Mr Nigel Lawson, Energy Secretary, and to the council of the Uranium Institute, London-based think-tank of the international uranium industry. As a former Swedish diplomat and foreign secretary, he is highly sympathetic to the present problems of the nuclear industry. But he pointed out that it is already flying with some of the consequences of under-bidding in safeguards earlier in its short history.

Governments had to do more to convince countries which had not signed the Non-Proliferation Treaty (NPT) that the security these non-signatories sought would be better assured



Dr Hans Blix

"In the long run this type of competition is counter-productive, not only for international security but also for that stable international system which is of such importance to industry."

if they renounced nuclear weapons.

Above all, Dr Blix would like to see the creation of a nuclear-free zone, in terms of nuclear weapons, established in the Middle East. But this would call for a closer involvement of the Arab states with the IAEA than exists at present.

Public perception of the role of the IAEA is distorted, he believed. It could not be expected to give assurances about nuclear material and plant to which it had not been given access. "The main risks of proliferation start where safeguards end."

Nor could it give assurances about the long-term intentions of government, such as whether they would always remain within the NPT, or that they would never denounce safeguards or contemplate making nuclear weapons.

Dr Blix felt strongly that governments must develop a workable system of sanctions for those who transgress against the NPT, or refuse to sign it. At present, the sanctions at its disposal were very restricted, beyond stopping funds for technical assistance and asking for return of equipment or materials supplied through the agency.

Demand for Liverpool factories rises sharply

By Ian Hamilton Fawzy

INQUIRIES for new factories in Liverpool rose dramatically in 1981 and continued unabated throughout the time of last summer's Tenth riots, according to figures released by the Liverpool development agency.

In the six months from April to September there were 437 inquiries, an increase of 86 per cent on the same period in 1980, with the space involved up by 69 per cent at 2.93m sq ft.

The biggest rise in demand was for factories of between 1,000 and 3,000 sq ft. Inquiries were 206 per cent up at 239, confirming other evidence of a surge in start-ups of small businesses.

On Friday in Liverpool Mr Patrick Jenkin, the Industry Secretary, revealed that the North-West was well ahead of all regions outside London in taking up the Government's loan guarantee scheme for small businesses.

Demand for large units is also rising. The agency's figures show 68 requests for help on factories bigger than 10,000 sq ft, 33 more than last year and accounting for 1.55m sq ft.

The figures appear to have been only slightly boosted by the launch of Ulster's Speke enterprise zone at the end of August, with 75 inquiries in September, compared with 47 in September 1980.

Much of the demand for smaller factories is believed to be from people already on Merseyside.

Mersey docks keep going in Arctic weather

SHIP OWNERS are praising the way the Mersey Docks and Harbour Company and its dock labour force have kept operations moving at the £50m Royal Seaforth complex during the six weeks of Arctic weather.

It has not been achieved without considerable cost, however. This will probably wipe out the savings achieved by the company's energy conservation campaign over the last 12 months.

Capt Trevor Platt, the Harrison Line terminal manager, told the company: "These are the worst weather conditions we have encountered at Royal Seaforth, and it is commendable that the wheels have been kept turning. The operation has obviously been much slower, but the ships have been moving in and out."

But any attempt a company makes to offset low growth at home by traditional exporting methods is blunted by the high value of the pound, which reflects the oil in the North Sea rather than Britain's relatively low productivity and high cost of production.

Which this in mind, QH has been trying to build up its operations outside the UK because, in spite of the "biggest in Europe" boast, it still depends heavily on its business in Britain.

This overseas expansion requires cash, and Burmah, with other fish to fry, feels disinclined to provide it.

Wider careers for accountants planned

BY MICHAEL DIXON, EDUCATION CORRESPONDENT

A STRATEGY to ensure chartered accountants retain broad career prospects over the next 20 years, instead of becoming progressively restricted to specialised auditing jobs in big professional practices, is published today by the Institute of Chartered Accountants in England and Wales.

The new "policy framework" for education and training leaves room for a change enabling trainees from industrial and commercial companies to qualify as members of the institute as well as students from professional firms.

Another proposal is to require members to take more professional training after qualifying — perhaps having to complete specified amounts of study over 10 years before being eligible for fellowship status — to avoid overloading or lengthening the period of pre-qualification training.

This change of balance is expected to prevent the costs of initial training from becoming too high for small professional practices, and so concentrating the development of future chartered accountants almost entirely in large practices.

Of the institute's 15,329 students in March 1981, 33 per cent were in firms with up to 10 partners, and only 9 per cent in those with 11-20 partners. The other 58 per cent were being trained by the 41 largest practices.

Although the document says changes will be made smoothly and only after full consultation, the admission of trainees working in industrial and commercial companies will be officially considered by the institute's council at the end of the year.

Education and Training — a policy framework. Free from Institute of Chartered Accountants in England and Wales, Moorgate Place, London, EC2R 6EQ.

Catholic bishops condemn Ulster teacher training plan

BY BRENDAN KEENAN

THE 90 per cent or so of Northern Ireland's Roman Catholics who attend Sunday mass, yesterday heard an attack by their bishops on the Government's proposals for rationalisation of teacher training in the province.

British ministers have found themselves unwillingly embroiled in one of Ulster's most sensitive religious issues as they try to cope with a drop in the number of school pupils and a surplus of teacher training places.

The bishops declared yesterday "Education Sunday" and, in a letter read at all masses, they claimed the Government's proposals "contravene religious freedom and the rights of conscience."

These charges are strongly

denied by the Government and by the Minister at the centre of the row, Mr Nicholas Scott.

His policy is based on the recommendations of a committee chaired by Sir Henry Chilver, which said that the two Catholic colleges — one for men and one for women — should amalgamate and move to the site of the state (and therefore largely Protestant) college at Stranmillis in South Belfast.

The numbers of Protestant children at school is falling faster than the number of Catholics, and the awkward implication is that, if student teacher numbers are reduced evenly, the small proportion of Protestants teaching in Catholic schools would rise sharply.

National Savings suffer

BY ERIC SHORT

NATIONAL SAVINGS ended 1981 on a quiet note, with net receipts in December falling £128.4m on the month to £240.4m.

This brought the total amount received by the Department of National Savings nine months into the current financial year to £2,900m. The Government has set a target of £3.5bn from National Savings in 1981-82, leaving another £600m to be acquired in the remaining three months.

National Savings in Decem-

ber were concentrated almost entirely on National Savings Certificates, both the index-linked — still popularly known as Granny Bonds — and the non-index-linked. The index-linked sold a net amount of £92.6m, little more than half the amount sold in November, while the non-index-linked sold £81m — around two-thirds of November's figures.

November's figures were boosted by the launch of the 23rd Issue, a non-index-linked certificate offering the highest yield ever of 10.51 per cent net of all taxes.

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CBI urges public sector pay curbs

By Our Industrial Editor

THE Confederation of British Industry has stepped up its pressure on the Government to curb the size of public sector pay rises.

Some of the CBI's members fear that their efforts to keep wages at low levels in the private sector may be in jeopardy by settlements in the public sector pay dispute involving groups such as miners, water workers and the railways.

This morning the CBI's fortnightly news bulletin drew attention to the way public sector pay has been running ahead of the private sector for recent years.

It repeats information submitted in the December issue of the Treasury's Economic Progress Report, which said that since 1970 the pay of public employees has increased considerably more in the public sector than in the private sector.

The CBI estimates that settlements in Whitehall and town halls have totalled 33.1 per cent since 1970, compared with 27.8 per cent in the unorganised industrial sector and only 25.3 per cent in the private sector.

Rate watcher

PETERBOROUGH City Council has been urged to appoint specialist consultants at £18,000 a year to protect the £1m rateable value of the Queensgate Developments, East Anglia's biggest shopping complex, which opens this spring on a 15-acre site in the city centre at a cost of £80m.

Mr John White, City Treasurer, warned the council that many stores and shops would have the benefit of specialist valuation advice in assessing their rateable value. He recommended employment of chartered surveyors for two years "to protect the interests of ratepayers."

Studio go-ahead

PLANS FOR Central Television's new £15m East Midlands studios in Lenton Lane, Nottingham, have been approved by Nottingham City Council planning committee but there is still no settlement of the election of a central authority to prevent the start of a programme for the East Midlands alliance.

Steel partners

BABCOCK CONTRACTORS of the UK is to collaborate with Ferrero Engineering of Canada to supply turnkey "mini" steel mills, it was announced today.

Babcock, part of Babcock International, will manage and plan the supply of materials for the steel plants while Ferrero, part of the Canadian Co-Steel group, will design the mills.

Quinton Hazell may lack buyers

Who wants a spare car parts maker? asks Kenneth Gooding

Any buyer of QH will, therefore, have to be a substantial organisation willing to put up the cash for overseas expansion as well as the purchase price (assets employed are valued at £50m). If, that is, the new parent goes along with the ideas of the QH management team, led by Mr Ray Sollett, chief executive since October 1976.

He insists that QH is a fully integrated group and it would make no sense to split it into chunks to be sold off piecemeal. The activities are grouped in four principal divisions:

● Quinton Hazell Automotive, the manufacturing operations with factories producing a whole range of components for cooling systems, brakes and transmissions, steering and suspension, silencers and exhausts.

● Partco, a national wholesale distribution company with 150 depots selling parts to the motor trade. About 40 per cent of the QH factories' output goes to Partco.

● Standard Motorists' Centres, the retail division with 120 depots in the UK operating an exhaust and tyre-fitting service — another good customer for

Going to work abroad?

Six ways we can help you make the most of it

- 1. Start planning now**  
Exciting though the prospect is, going to work abroad needs careful planning if you're going to get the most out of it financially. The complexities and conditions of foreign residence, taxation and investment opportunity are so great that professional advice is essential. Lloyds Bank can provide that advice and we've produced two new booklets on the subject, which are available from our branches.
- 2. Tax you need not pay**  
Tax is a most crucial consideration. It is vital that your precise tax position is agreed by the Inland Revenue, preferably long before you go. We can do it for you and claim any refunds which may be due.
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There are rules which decide if you qualify for the benefits of an overseas worker. Contravene them and you lose the benefits. We'll advise you.
- 4. Letting your house at home**  
Who should look after it? Will you have to pay tax on the rent you receive? We know the answers to the tax questions which arise when you have a tenant.
- 5. Low-tax areas**  
You do not necessarily have to use remote tax areas. Our branches in the Channel Islands and Isle of Man can provide the advice and action required to minimise your tax liability and increase your capital.
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The basic rules of saving and investment do not change, but tax rules do. Find out how your money can work harder for you. If you're still in the UK, ask at your nearest branch of Lloyds Bank, or, if you are already abroad, contact Lloyds Bank at one of the addresses below:  
Lloyds Bank Limited, 9 Broad Street, St. Helier, Jersey, Channel Islands.  
Lloyds Bank Limited, PO Box No 8, Victory House, Prospect Hill, Douglas, Isle of Man.

More help for expatriates at the sign of the Black Horse



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UK NEWS

LABOUR

Owen leads SDP campaign to woo Plymouth voters

NOT SINCE Labour's landslide victory in 1945 have the Conservatives suffered the humiliation of seeing all three Plymouth constituencies in hostile hands.

It is a measure of the impact which the SDP-Liberal alliance has made in the city in a few short months that, even though the next general election is still over the political horizon, the warning lights are already flashing in Tory nerve centres.

Leading the attempt to persuade Plymouth voters to reject both the existing major parties will be Dr David Owen, MP for Devonport, who just under a year ago signalled the beginning of a significant development in British politics by breaking with his constituency Labour Party.

The astonishing level of public support shown for the SDP in recent by-elections and public opinion polls underlines the importance of Dr Owen's determination to ensure that the revolt by the moderates against the dominance of the Labour Party did not peter out in a series of ineffectual gestures.

Since its uncertain beginnings he has been a central driving force in the SDP's development. He is certain to retain a pivotal position when Mr Roy Jenkins eventually returns to the Commons and takes over the parliamentary leadership.

Foreign Secretary at 38 — when appointed to the office in 1977 he became its youngest occupant since Anthony Eden — Dr Owen is one of the comparatively few British politicians who can be sure of instant recognition on the international stage.

False image

Arrogance is the charge most frequently levelled against him by detractors. Mannerisms which betray a readiness to be both aloof and combative ("talks like a Guards officer," says one Old English Tory who knows him well) helps to perpetuate what those closest to him insist is a false image.

Dr Owen first became a Plymouth MP in 1966, ending an 11-year period of Conservative domination which began when Mr Michael Foot, who scored a dramatic victory at Devonport in 1945, suffered the first of two wounding defeats inflicted on him in his native city.

In February 1974, after a sharp assessment of boundary changes which restored Plymouth to a city of three constituencies, Dr Owen switched from Sutton to capture Devonport from Dame Joan Vickers, who had twice triumphed over Mr Foot. He then beat off her attempt to regain it eight months later.

Another massive rejigging of political boundaries in Plymouth will take effect before the next general election. Many voters in the existing Devonport, Drake and Sutton divisions will find themselves with different electoral neighbours as a result.

Three newly-formed constituencies, with the uninspiring names of Plymouth North, Plymouth Central and Plymouth East, are proposed. Calculations which did not take the SDP-Liberal alliance into account suggest that had Dr Owen remained in the Labour Party and fought Plymouth North he would have escaped for the first time the perils of being in Westminster's marginal seat brigade. Plymouth North will include significant sections of the existing Devonport constituency.

While his supporters argue that such old yardsticks are now largely irrelevant — and some are bold enough to assert he is capable of winning any one of the three seats — it is notable that Dr Owen is keeping his options open.

Some of the SDPs top echelon are urging him to eschew short term heroics and choose the constituency most likely to provide a sound and enduring political base. They believe he provides the best guarantee that the party does not become a mushy centre grouping, but remains the cutting edge needed to clear a

In his concluding article on the Liberal/SDP alliance in the West Country, Ivor Owen looks at the options open to Dr David Owen in the face of changing constituency boundaries

way through some of Britain's most deep-seated problems.

Others advocate a more adventurous course, and point to the good social mix in the SDP's impressive membership in the Plymouth area. This has provided further confirmation from the Labour Party, Dr Owen enjoyed a good deal of broad based support which crossed conventional party lines.

One of the reasons for this is the decisive role he played when Navy Minister in securing the future of Devonport Dockyard, on which the prosperity of Plymouth and much of the surrounding area depends.

It was his influence which resulted in Devonport getting the capacity to refit nuclear submarines. That has proved the key factor in averting closure or rundown, the fate facing Chatham and Portsmouth. Optimism among SDP supporters in Plymouth is also encouraged by the continuing disarray in the Labour ranks — still reeling from Dr Owen's defection — and the evident malaise in the local Conservative organisations.

In contrast to earlier years not one of the three Conservative constituency associations employs a full-time agent. Attempts to reach agreement on financial arrangements, which would enable a joint appointment to be made, have failed.

The absence of the skilled professionalism of the Conservative Party machine — an omission which will doubtless be repaired well in advance of the next major poll — is a bonus for Labour. A full-time agent looks after Labour's interests throughout Plymouth.

Main hope

The Devonport division also reports a bigger response to its fund raising efforts than was achieved a year ago and has already lined up an able prospective candidate. He is 31-year-old Mr Julian Priestley who holds an administrative post in the European Assembly. He has twice tried to secure election for a Plymouth seat. Steering clear of Dr Owen would improve his prospects of proving that third time can be lucky.

In any event, Mr Priestley is likely to be Labour's main hope of winning a constituency west of Bristol.

For all his outstanding record of achievement at both local and national level it is unlikely that Dr Owen will risk standing in Plymouth East, largely based on the present Sutton division where Mr Alan Clark secured an 11,287 majority for the Conservatives in 1979.

Plymouth Central could turn out to be Dr Owen's final choice. Apart from a slice of the present Devonport division its largest component will be made up of parts of the present Drake constituency. The incumbent Conservative MP, Miss Janet Fookes, has needed all her vigour and tenacity to retain a majority and survived by only 34 after a succession of recounts in October 1974.

One thing is sure. The constituency contested by Dr Owen will be the centre of media attention, not least because Mr Foot has promised to participate in the sit-out campaign which Labour is determined to mount against him.

Strike may close port this week

By Brian Groom, Labour Staff

THE PORT OF Southampton, scene of more than 10 months of disputes, faces a new crisis which could result in closure this week.

Cargo-handling is almost at a standstill because of a strike by the port's 140 foremen, after being reduced to a third of capacity since October by an unresolved dispute with 150 cargo checkers on a new shift system. Only the cross-Channel ferries are working.

The main employer, the British Transport Docks Board, last week said it would resume three-shift working in the container berths from the weekend, in anticipation of a settlement with the checkers. But the checkers threw out the peace plan, and the foremen voted to strike.

Today the Docks Board must either begin paying the port's 1,400 dockers as if normal working were resumed — a big expense on top of the millions lost so far because of disputes — or risk a confrontation.

The dockers' insistence that other groups, such as the foremen and checkers, should not be allowed to work extra shifts in overtime, which give them potentially higher earnings, is at the root of the troubles.

Welsh miners hold key to pay ballot

BY ROBIN REEVES, WELSH CORRESPONDENT

THE DELAYED strike ballot of 25,000 miners in South Wales will take place tomorrow, amid signs that it may hold the key to the result of the national ballot on the Coal Board's offer of a 9.5 per cent pay rise.

The weekend thaw cleared the way for distribution of ballot papers to the many Welsh collieries cut off by last week's heavy snow. South Wales miners account for some 10 per cent of the total voting strength of the union.

Although traditionally the area is left-wing, a big majority vote against the pay offer is by no means certain.

Besides holding up the ballot, last week's severe weather also prevented Welsh miners' leaders from holding a series of pithead meetings to explain their reasons for recommending rejection of the offer and drumming up support for strike action "if necessary."

Weekend reports that collieries elsewhere may not have backed the National Executive's recommendation in sufficient strength to secure the 55 per cent support for strike action, could well influence the Welsh miners' voting in favour of the NCB's offer. The acute unemployment affecting the whole

of Wales could also encourage a moderate stance.

Even so, Mr Des Duffield, the South Wales NUM's vice-president, said he would be "very surprised" if there was a vote to accept the 9.5 per cent offer. Sir Derek Ezra's warnings of no more cash, whatever the ballot result, and Mr Joe Gorwey's last-minute intervention, had angered many miners and would, he felt, ensure a bigger vote against the offer.

At the same time, Mr Duffield was careful to stress that the executive could never recommend an offer involving a cut in miners' living stan-

dards. If they chose to accept it, that was the miners' choice. It would, however, be treated as a "sign of weakness by both the NCB and the Government."

Tomorrow's poll will take place under conditions of strict secrecy. Local union officials have been instructed to bar the Press from colliery premises or risk the men's votes being disqualified.

The ban on the media follows unfounded Press allegations of ballot rigging in South Wales a few years ago, which led to an NUM investigation and an eventual full apology by the NUM headquarters.

Journalists uneasy at merger

By John Lloyd, Labour Correspondent

WIDESPREAD opposition to the proposed merger with the print craft union, the National Graphical Association, is revealed in motions to the annual delegate meeting of the National Union of Journalists.

Journalists are also concerned over racial bias in the media and "bingo" wars weakening the financial position of the popular papers, and have called for mergers and the appointment of editors to be subject to journalists' approval.

The merger issue is likely to be the most controversial one of the AGM, to be held at the end of March. Talks between the unions are said by both teams of negotiators to have gone well.

NUB chief named

LEADERS of the National Union of Blasfurnacemen have elected Mr Nicholas Leadley, 57, general secretary from April 26, when Mr Hector Smith retires. Mr Leadley represents northern region members.

The NUB has been in merger talks with the much bigger Iron and Steel Trades Confederation. The two are likely to combine soon.

Occupation of Dunlop factory to continue

BY OUR WELSH CORRESPONDENT

WORKERS AT the Dunlop Group's Semtex floor coverings plant at Brynamwr, South Wales, voted yesterday to continue a five-week occupation of their factory.

They rejected an ultimatum from the Dunlop management to quit the site by 7 am this morning or lose all severance payments.

The company said ten days ago that it was closing the factory and withdrawing from the market for do-it-yourself rubber and carpet tiles because of the adverse effects of the

factory occupation which began on December 15.

The workers' action was originally aimed at securing withdrawal of 80 redundancies and guarantees of further investment to underpin the plant's future. Dunlop's decision to close the factory outright will mean about 600 redundancies.

According to Mr George Howard, trade union convenor at the factory, the workers have been inundated by offers of support from other factories in the Dunlop Group which fear they may be threatened with

the same medicine if the company's management is "allowed to get away with it."

Mr Geoffrey Jacobs, district officer of the main union involved, the Transport and General Workers Union, said the decision to reject Dunlop's ultimatum — taken at a two-hour meeting yesterday — was unanimous.

"They realise that this could now mean a confrontation with the law and involve people going to prison. But they accept it. The dispute will go on until

there is a negotiated outcome," Mr Jacobs said.

The workers had been told by the management that they were in breach of their contracts but that Dunlop was willing to make ex-gratia severance payments equal to the statutory minimum redundancy terms, provided the occupation ended this morning, he said.

Earlier Mr John Miller, national officer of the Transport Union's chemicals group had tried unsuccessfully to open discussions with Dunlop over the weekend.

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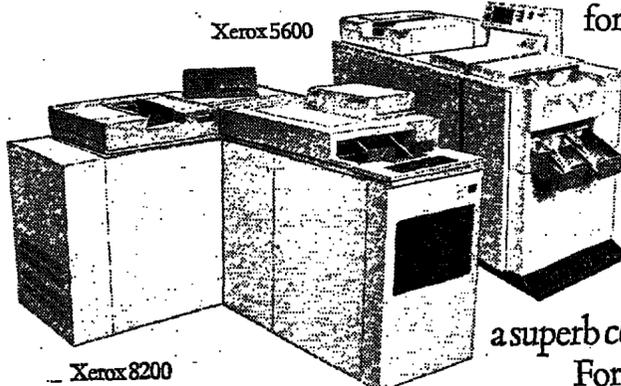
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Discount house links up with commodity broker

BY DAVID MARSH

GERRARD AND NATIONAL, a leading City discount house, is setting up a joint company with London commodity broker Inter Commodities to operate on the planned London financial futures market.

The unique link has been forged to pool the expertise of the two companies in money and commodity trading.

The financial futures market, due to start in September, allows currencies and interest rate instruments to be traded like commodities. The City will face growing competition in financial futures from diversified U.S. broking firms which trade both money and commodities. So the pooling of resources

between Gerrard and Inter Commodities may be only the first of a number of link-ups among London companies planning to trade on the exchange.

The new company will act primarily as a clearing member of the London exchange. It intends to take part in the clearing facilities which will be organised by the International Commodities Clearing House.

Mr Brian Williamson, a director of Gerrard, said the two companies planned to pool their skills. Gerrard had particular expertise in banking, while Inter Commodities would contribute its experience in commodity trading and on the financial futures market in Chicago.

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**CONTRACTS AND TENDERS**



**TENDER PREQUALIFICATION  
QATAR GENERAL PETROLEUM CORPORATION  
HEADQUARTERS BUILDING - WEST BAY**

Qatar General Petroleum Corporation will shortly invite bids for the complete construction contract for the New Headquarters Building, West Bay, Doha, Qatar.

The New Headquarters Building comprises approximately 21,000 square metres of high standard four storey offices over lower parking floors for approximately 340 cars. The New Headquarters is sited adjacent to the existing QGPC Headquarters and the works include various connections between the two buildings.

The works will comprise: piling by approved subcontractors, general building works, engineering services including air conditioning, finishings, fixed furniture and equipment and external works including planting. Facilities to be provided include a computer centre, cafeteria, office accommodation, conference rooms etc.

Only prequalified firms will be invited to participate. Acceptance for prequalification will be limited to firms who have during the last 5 years—built at least one project of similar type, size and quality and—executed at least 3 major projects in the Gulf area.

Interested firms should submit applications for prequalification in duplicate not later than January 21 1982.

1st copy to be sent to:—

The Manager,  
Engineering and Construction Dept,  
QGPC (HQ),  
PO Box 3212,  
DOHA—QATAR.  
Telex: 4343 PETCOR DH

and 2nd copy to:

Weidleplan Consulting GmbH,  
Planer Architekten Ingenieur,  
Postfach 30 08 09,  
D-7000 Stuttgart 30,  
WEST GERMANY.  
Telex: 722313 WEIDL D

in covers stating "PREQUALIFICATION—QGPC HEADQUARTERS BUILDING DOHA"

Application must include:—

- 1 Full details of company including forms of incorporation and clarification of relationship of any proposed joint venture.
- 2 Complete financial statements (audited) for the last five years including annual turnover in Qatar and the Middle East.
- 3 A list of current projects quoting value, involvement and percentage completed with contract completion date.
- 4 A list of comparable completed projects with brief details of value, involvement, programmed and actual dates of completion.

It is intended to invite bids in March 1982 from a selected list of prequalified firms who will be notified accordingly by QGPC.

The Tender period will be 12 weeks and Bills of Quantities will be provided. Tender bonds will be required.

The contract period will be approximately 27 months and the contract will be turnkey fixed price.

**BAHRAIN LIGHT INDUSTRIES  
COMPANY**

**FURNITURE PLANT**

**INTERNATIONAL PREQUALIFICATION OF  
EQUIPMENT SUPPLIERS FOR WOODEN  
FURNITURE MANUFACTURING**

The BAHRAIN LIGHT INDUSTRIES COMPANY wishes to prequalify firms interested in tendering for the equipment of the future furniture plant in Bahrain, The Gulf.

The plant (approximately 9,000 m<sup>2</sup>) includes a boardline, veneerline, solid woodline, surface treatment line and an upholstery line to produce—on an industrial scale—furniture, chairs, doors and upholstery.

Tender documents are expected to be available in February, 1982.

Firms with experience in similar works and who are interested in the delivery, erection and commissioning of the complete plant equipment, should send prequalification documents with information about the firm, list of references and their abilities for export financing not later than January 31, 1982, to:

MOTOR COLUMBUS  
Consulting Engineers Inc.  
Parkstrasse 27, 5401 Baden  
Switzerland

**KINGDOM OF MOROCCO**

**OFFICE NATIONAL DE L'EAU POTABLE**

**CALL FOR TENDER No. 29/DE/81**

The Office National de l'Eau Potable (ONEP) have issued an international call for tenders concerning the project of supply of drinking water to the town of Tamzaourt (30 kms away) (financial participation of The World Bank).

The call is for the design to the completion of the works of a purifying plant with a debit of 350 l/sec.

Correspondence should be in FRENCH.

Tender documents may be obtained from the issuing authority at a cost of DH 1,000.  
Closing date: 24/3/1982.

Please write to: Office National de l'Eau Potable  
Division Equipement  
Quartier Administratif  
RABAT

specifying on each envelope the title and date of the tender.

**KINGDOM OF MOROCCO**

**OFFICE NATIONAL DE L'EAU POTABLE**

**CALL FOR TENDER No. 24/DE/81**

**AGADIR DRINKING WATER SUPPLY**

The Office National de l'Eau Potable (ONEP) have issued an international call for tenders concerning the project of supply of drinking water to the town of Agadir.

Summary of the works involved:

- laying out of trenches
- supply and laying down of pipes Ø 600/8500 ml and additional equipment such as joints and taps
- additional works such as man-holes, various passages...

Only companies from countries member of THE WORLD BANK and SUISSE may participate. Correspondence should be in FRENCH.

Tender documents may be obtained from the issuing authority at a cost of DH 1,000.

Closing date: 24/03/1982.

Please write to: Office National de l'Eau Potable  
Division Equipement  
Quartier Administratif  
RABAT

specifying on each envelope the title and date of the tender.

**KINGDOM OF MOROCCO**

**OFFICE NATIONAL DE L'EAU POTABLE**

**CALL FOR TENDER No. 25/DE/81**

The Office National de l'Eau Potable (ONEP) have issued an international call for tenders concerning the project of supply of drinking water to the town of TIZNIT and area from the Youssef Ben Tachfine dam on the Oued Massa, with a debit of 145 l/sec. The project will be undertaken with the financial participation of: the KRENDISTANSTALT FÜR WIEDERBAU (K.F.W.).

The works have been programmed in three stages:

- No. I — PIPES
- No. III — ELECTRO-MECHANICAL EQUIPMENT
- No. IV — PURIFYING STATION

Details on each part-project may be obtained from the Export Intelligence Service, E.O.T.B., 50 Ludgate Hill, EC4M 7HU — telephone: 01-248 5757.

Tender documents may be obtained from the issuing authority at a cost of DH 1,000.

Closing date: 24/03/1982.

Please write to: Office National de l'Eau Potable  
Division Equipement  
Quartier Administratif  
RABAT

specifying on each envelope the title and date of the tender.

**FOR AGRICULTURAL PRODUCE  
INTERVENTION BOARD**

**INVITATION TO TENDER 1**

Tenders are invited for the urgent supply of 8,740 tonnes of bagged soft wheat flour for delivery on a job stored and informed basis to an ESC port. Loading shall commence no earlier than 15 February 1982 and no later than 22 February 1982.

**INVITATION TO TENDER 2**

Tenders are invited for the urgent supply of 2,000 tonnes of bagged soft wheat flour for delivery on a job stored and informed basis to an ESC port. Loading shall commence no earlier than 15 February 1982 and no later than 22 February 1982.

The price for the supply and transportation costs of the flour for the above tenders will be determined on examination of the tenders which must be submitted by noon on Wednesday 27th January 1982 to: HOME GROWN CEREALS AUTHORITY, Hamlyn House, Highgate Hill, London N19 5PR

Notice of invitation to tender together with tendering forms may be obtained from: Branch 3 (Cereals), Internal Market Division, Intervention Board for Agricultural Products, Fountain House, 2 Queens Walk, Reading RG1 7QW Tel: Reading (0734) 88225 Ext. 362/276

**TANZANIA ELECTRIC SUPPLY COMPANY LIMITED (TANESCO)**  
Invite Prospective Tenderers for

**THE CONSTRUCTION OF THE MTERA  
HYDRO-ELECTRIC POWER PLANT.**

**PHASE III DEVELOPMENT OF THE GREAT RUAHA RIVER.**

1. The Tanzania Electric Supply Co. Ltd. (TANESCO) intend to harness the available head in the Great Ruaha River in connection with the recently completed Mtera Dam by constructing a Hydro-Electric Power Plant.

2. The Government of Tanzania has applied for international development credits from the International Development Association (IDA), the Norwegian Agency for International Development (NORAD), the Swedish International Development Authority (SIDA), and from other agencies for the construction of the Mtera Hydro-Electric Power Plant. It is intended that proceeds of these credits will be applied to payments under the contracts for the project. The credits are expected to be available about mid-1982.

3. The works for the Mtera Power Plant will comprise all civil, mechanical and electrical works for the installation of 2x40 MW generating capacity in an underground power station near the existing Dam.

3.1 The following Tender Documents are intended to be issued for the Mtera Power Plant during April 1982.

- TD 11. Civil works, including ventilation and various temporary facilities,
- TD 12. Penstock Steel lining and Gates,
- TD 13. Turbines, Pipework and Crane,
- TD 14. Generators,
- TD 15. Transformers, and
- TD 16. Other electrical equipment incl. 220 kV switchyard

3.2 The civil works will comprise the construction of a short headrace tunnel, two vertical penstocks (length about 100 m each) an underground powerhouse, an approximately 10 km long tailrace tunnel (in total about 850,000 m<sup>3</sup> of rock excavation), roads and various housing and storage facilities.

3.3 The Mtera site is located on the Great Ruaha River in the Iringa region, Tanzania about 650 km by road from Dar es Salaam.

4. Contractors wishing to be considered for the civil, mechanical and/or electrical works should submit the following information for prequalification as evidence of their capability.

- 4.1 Records of similar projects completed in the last ten (10) years.
- 4.2 Financial statement of last year and a summary of last three (3) years.
- 4.3 Detailed reports on company structure.
- 4.4 Curriculum vitae of key staff giving educational background and employment experience.
- 4.5 Details of equipment and resources which will be available for the work.

5. Prospective Tenderers are invited to register themselves by submitting in duplicate the documents in 4.1 to 4.5 above not later than March 15th, 1982.

Envelopes with documents are to be marked: Mtera Power Plant Project, Tanzania Prospective Tenderer

And sent as follows:

1 Copy to: TANESCO P.O. Box 9024 Dar es Salaam Tanzania

1 Copy to: SWECO P.O. Box 5038 S-102 41 Stockholm Sweden

6. Prequalified Tenderers will be notified when the respective Tender Documents are available and will be required to purchase three sets of Documents. The cost of the three sets will be US Dollars 400 for each of the six contracts specified under 3.1 above.

**COMPANY NOTICES**

**GREATERMANS STORES LIMITED**

**NOTICE TO SHAREHOLDERS**

NOTICE IS HEREBY GIVEN that the Board of Directors has declared the following dividends payable on 28th February, 1982, to 5%, Second 5% and Third 5% Preference Shareholders respectively, registered in the books of the Company at the close of business on Friday, 29th January, 1982.

A—5% CUMULATIVE PREFERENCE SHARES—DIVIDEND NO. 92  
A dividend of the rate of 5% per annum for the 28 months ending 28th February, 1982—equivalent to 5 cents per share.

B—5% CUMULATIVE PREFERENCE SHARES—DIVIDEND NO. 93  
A dividend of the rate of 5% per annum for the 28 months ending 28th February, 1982—equivalent to 5 cents per share.

C—5% CUMULATIVE PREFERENCE SHARES—DIVIDEND NO. 94  
A dividend of the rate of 5% per annum for the 28 months ending 28th February, 1982—equivalent to 5 cents per share.

D—5% CUMULATIVE PREFERENCE SHARES—DIVIDEND NO. 95  
A dividend of the rate of 5% per annum for the 28 months ending 28th February, 1982—equivalent to 5 cents per share.

The dividends are declared in South African currency and dividends payable from the London Office will be calculated at the rate of exchange ruling between the Rand and Sterling on the 27th February, 1982.

Dividend cheques, despatched from the London Office to persons resident in Great Britain or Northern Ireland will be subject to deduction of United Kingdom Income Tax at rates to be advised at after allowing for relief in any respect of South Africa Taxes.

The Company will, where applicable, deduct the non-resident shareholders' tax of 15% from dividends payable.

For the purpose of having the above dividends, the Share Register in respect of the above Preference Shares will be closed on 30th January, 1982, to 15th February, 1982, both dates inclusive.

Requests for payment will be noted on or about the 28th February, 1982.

By Order of the Board  
Registered Office: 250 Commercial Street, London, E1C 2JG  
South African Transfer Secretaries: 1000 Market Street, Johannesburg, 2001  
534 Market Street, Johannesburg, 2001  
P.O. Box 4884, Johannesburg 2000.  
London Transfer Secretaries: Graham Registration Services, Bourne House, 24 Beckenham Road, Beckenham, Kent, BR3 4TU, United Kingdom.

**NOTICE OF PURCHASE  
EUROPEAN INVESTMENT  
BANK**

U.S. \$5,000,000 11% BONDS OF 1980, DUE 15th JANUARY 1992

**RBC INTERNATIONAL  
INCOME FUND LIMITED**

**BEARER DEPOSIT RECEIPTS**

An interim dividend in respect of the period ended 31st November 1981 has been declared and will be payable on the 15th January 1982. US\$0.93 will be paid against presentation of Coupon No. 3 of the bearer deposit receipts at the Fund's Depository.

THE ROYAL BANK OF CANADA (CHANNEL ISLANDS) LIMITED  
P.O. Box 48  
St. John's Avenue  
St. Peter Port  
GUERNSEY  
Channel Islands

**CHILEAN EXTERNAL LONG TERM DEBT  
—LAW NO. 8962**

**CITY OF VINA DEL MAR  
5% LOAN 1913**

NOTICE IS HEREBY GIVEN that all the outstanding bonds of the above-mentioned loan will be redeemed at par on 28th January 1982 and all subsequent coupons, attached.

These bonds when presented at the office of Midland Bank Limited Stock Exchange Services Department for redemption must have the coupon dated 28th July 1982 and all subsequent coupons, attached.

The usual interval of four clear days will be required for examination.

Midland Bank Ltd.  
Stock Exchange Services Dept.  
Mariner House, Rouse Street,  
London EC3N 4DA.

**BANQUE INTERNATIONALE  
POUR L'AFRIQUE  
OCCIDENTALE**

US\$20,000,000  
Floating Rate 1978/83

The rate of interest applicable for the six months period beginning on January 15, 1982 and set by the reference agent is 15% annually.

**Crédit National**

USD 75 millions  
floating rate 1978/88

The rate of interest applicable for the six months period beginning on 15th January 1982 and set by the reference agent is 15% annually.

**ART GALLERIES**

LEFFRE GALLERY, 30, Bruton St. W1. 01-433 1572/3. AN EXHIBITION OF IMPRESSIONIST XIX AND XX CENTURY WORKS OF ART. Mon-Fri 10-5.

MARLBOROUGH 5, Alderman St. W1. ALEX KATZ — RECENT PAINTINGS. Unit 5, Feb. Mon-Fri 10-5.30. Sat 10-12.30 pm.

MATHIAS GALLERY, 22, Motcomb Street, London, SW1. Tel. 233 592. Sculptures, Paintings in ARABIA.

WHITECHAPEL ART GALLERY, Whitechapel Way 33, E1. Tel. 252 1111. East to 24 Jan. BRITISH SCULPTURE IN THE TWENTIETH CENTURY. Part 11 1951-80. Sun-Fri 11-8. Cl. Sat. Adm. £1.50. Free Mon 2-6.

AGNEW GALLERY, 43 Old Bond St. W1. 020 5176. 19th ANNUAL WATER COLOUR EXHIBITION Unit 19. Feb. Mon-Fri 9.30-5.30. Thurs until 7.

THE GALLERY, 43 Old Bond St. W1. 020 5176. 19th ANNUAL WATER COLOUR EXHIBITION Unit 19. Feb. Mon-Fri 9.30-5.30. Thurs until 7.

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**WE THE LIMBLESS, LOOK TO YOU FOR HELP**

We come from both world wars. We come from Korea, Kenya, Malaya, Aden, Cyprus... and from Ulster.

Now, disabled, we must look to you for help. Please help by helping our Association. BLESMA looks after the firmless from all the Services. It helps to overcome the shock of losing arms, or legs or an eye. And, for the severely handicapped, it provides Residential Homes where they can live in peace and dignity.

Help the disabled by helping BLESMA. We promise you that not one penny of your donation will be wasted.

Give to those who gave—please

**BLESMA**  
BRITISH LIMBLESS  
EX-SERVICE MEN'S ASSOCIATION

Donations and Information: Major The Earl of Ancaster, KG, VC, TD, Midland Bank Ltd., Department FT, 60 West Smithfield, London EC1A 9DX

Help to those who gave—please

**BLESMA**  
BRITISH LIMBLESS  
EX-SERVICE MEN'S ASSOCIATION

**CLASSIFIED ADVERTISEMENT RATES**

EFFECTIVE JANUARY, 1982

	Per line	Single column cm
Commercial and Industrial Property	8.00	27.50
Residential Property	6.00	20.00
Appointments	6.50	20.00
Business, Investment Opportunities	8.50	29.00
Businesses for Sale/Wanted	8.50	29.00
Personal	6.00	20.00
Motor Cars	6.00</	

BUSINESSMAN'S DIARY UK TRADE FAIRS AND EXHIBITIONS

Table listing trade fairs and exhibitions with columns for Date, Title, and Venue. Includes events like 'Witch Computer Show' and 'HOTELMYTA'.

OVERSEAS TRADE FAIRS AND EXHIBITIONS

Table listing overseas trade fairs and exhibitions with columns for Date, Title, and Venue. Includes events like 'Boat Show' and 'Europe 82'.

BUSINESS AND MANAGEMENT CONFERENCES

Table listing business and management conferences with columns for Date, Title, and Venue. Includes events like 'CBI: Jordan—the new 5 year Development Plan'.

Anyone wishing to attend any of the above events is advised to telephone the organisers to ensure that there has been no change in the details published.

Financial Times Conferences

EUROPEAN PULP AND PAPER IN THE 80's. Helsinki — 17 and 18 March 1982. This conference sponsored by Helsinki Sanomat will review problems and prospects for the industry in the 80's...

THE EUROMARKETS IN 1982. London — 9 and 10 February 1982. In view of controversies over the new French economic policy the Financial Times is pleased to announce that M. Benoit Jolivet, Advisor, Ministry of Economy and Finance, will be giving a major address at the above Conference.

All enquiries should be addressed to: The Financial Times Limited Conference Organisation, Minster House, Arthur Street, London EC4R 9AX.

Tel: 01-621 1355 Telex: 27347 FTCONF G Cables: FINCONF LONDON



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In the U.S.A. we're known as The Yes People. It's a title we're proud of a name we earned the hard way—through our willingness to dig in and work to develop the leasing plan that's precisely right, financially and in every other way, for that particular client.

McDONNELL DOUGLAS FINANCE CORPORATION LTD. MDFC A subsidiary of McDONNELL DOUGLAS

APPOINTMENTS INSURANCE

Group changes at Miller Buckley

Mr Peter Arton group financial director of MILLER BUCKLEY has been appointed a main board director of Buckley Investments and also a director of Miller Buckley Developments.

The Board of MATERIALS AND METHODS announces that Mr C. M. Durkin, who has been technical director since 1974, has now been appointed managing director.

Provincial Insurance announces the appointment, from March 1 1982, of Mr Kenneth J. Walker, MA, ACII, as deputy managing director.

As part of its 1982 expansion programme CENTURYAN SECURITY announces a nationwide restructuring programme to assist senior management, and has appointed Mr J. Dick and Mr Alan Begg (previously general manager for southern Scotland and London respectively) as regional directors.

Mr John Sackfield Wallwork has been appointed a director of the DAILY MAIL and GENERAL TRUST.

Mr J. M. Sonness, FFA, a director and general manager of the LIFE ASSOCIATION OF SCOTLAND, was elected chairman of the Associated Scottish Life Offices at their stated annual meeting in Edinburgh on January 15.

Mr Trevor Barton has been elected chairman of the financial sector specialist group of the INSTITUTE OF MANAGEMENT SERVICES.

Mr Mike Webster has been appointed marketing director at ANSWERING, said to be probably the longest established live 24-hour telephone response network for the professions and industry in the UK.

PARLIAMENTARY DIARY

Table of parliamentary diary with columns for Day (Today, Tomorrow, Wednesday, Friday), Commons, Lords, and Bill/Topic.

Life and pensions sales break annual records

BY ERIC SHORT

LAST YEAR was another record-breaking one for the life assurance industry, according to provisional figures for new life and pensions business.

The figures were issued on Thursday by the three life company associations — the Life Offices Association, the Associated Scottish Life Offices and the Industrial Life Offices Association.

New annual premiums last year just failed to reach £2bn, rising 17 per cent to £1,990m from £1,700m, an increase which comfortably exceeds the 12 per cent rise in the Retail Price Index.

Single premium business did even better, exceeding £1bn for the first time and reaching £1,070m, 87 per cent higher than the £570m of 1980.

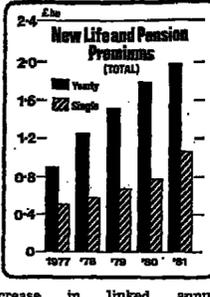
The industry appears to be thriving despite the recession, but the figures for new business issued by individual life companies show a varied picture.

The bright spots in last year's business were headed by the continued growth of unit-linked life assurance and pensions business. A clear picture of the growth in 1981 will be available when the Life Offices Association publishes the fourth-quarter new business figures for ordinary life and personal pension business due in a few weeks' time.

But at the end of September, the totals for linked annual premiums at £1,730m and single premiums at £444m had both passed the sales for the whole of 1980 of £1,690m for annual premiums and £321m for single premiums.

The linked life assurance companies participated fully in last year's savings boom.

Abbey Life, one of the two largest linked life companies in the UK reported an 86 per cent jump in linked single premiums to £55.6m and a 86 per cent in-



crease in linked annual premiums to £55.4m. Hambro Life, the other major linked life company, is due to report in a few days.

The second bright spot has been the buoyancy of the self-employed pensions market. The further tax concessions in the 1980 Finance Act meant that the self-employed invest more of their earnings in a pension contract and could invest unused reliefs of previous years.

The introduction of a loan-back facility proved a superb marketing aid to overcome a reluctance by some self-employed to lock away assets in a pension contract.

The overall growth will be known when the Life Offices Association publishes the fourth-quarter figures. But by end-September, self-employed annual premiums at £98m were nearly 50 per cent higher than for the first nine months of 1980, and single premiums at £144m more than double. Both linked and conventional schemes have participated in this boom.

Savings through conventional with-profit contracts have shown a mixed picture in 1981. Many banks have linked up with life companies in their drive to

enter the house mortgage market, with the bank providing the finance and vetting the loan applications and the life company using its marketing outlets and providing low cost with-profit endowments for the repayment of the mortgage.

Although the association does not publish overall figures for this sector of the market life companies which have tied in with one or more banks have reported substantially higher sales despite the dull house purchase market in 1981.

Sales of with-profit endowments in the form of straight regular savings plans remained static in 1981 and were one of the dull spots of the year. This was particularly noticeable with industrial life companies. Industrial life business, where agents collect the premiums at the homes of policyholders, showed no growth with annual premiums of £211m.

The other dull market in 1981 has been company pension business—a sector hit by the recession in two ways. The growing number of redundancies has meant a cut back in membership of pension schemes and hence in premium income.

The lower growth in earnings of employees in the private sector has also meant a corresponding lower growth in pension increases, and thus lower increases in premiums. But it is a very mixed picture with some life companies severely hit and others with quite good results considering the economic situation.

The pattern of business changed significantly in 1981. Because of the uncertain outlook employers are unwilling to commit themselves to making payments. They are making single premium payments to meet current liabilities rather than annual premiums, which commit them to future payments.

WEEK'S FINANCIAL DIARY

Table of weekly financial diary with columns for Date (Today, Tomorrow, Thursday, Friday, Saturday, Sunday), Company Meetings, Dividend & Interest Payments, and Board Meetings.

Snow, sush, fog and strikes. Is it worth it?

The WHICH COMPUTER? Show National Exhibition Centre Birmingham 19-22 January 1982

If you value greater cost-effectiveness and efficiency in your business, it most certainly is. The Which Computer? Show is the one time in the year when you can check out all the new technology under one roof.

BASE LENDING RATES

Table of base lending rates for various banks including A.B.N. Bank, Allied Irish Bank, American Express Bk, Amro Bank, Henry Ansbacher, etc.

FINANCE FOR INDUSTRY TERM DEPOSITS. Deposits of £1,000-£50,000 accepted for fixed terms of 3-10 years. Interest paid gross, half-yearly. Rates for deposits received not later than 29/1/82

TECHNOLOGY

New thrust in no-break power ITT's come-back in computers

BY GEOFFREY CHARLISH

AT THE foot of the Harz mountains some 100 miles down the autobahn from Hannover the 1,500 strong £38m turnover Anton Piller organisation plans to take an increased share of the world market for specialised power units by deploying a new development in rotary machines called Uniblock.

Already strong in areas such as 400 Hz rotary power supplies for big computers (it claims to have 60 per cent of the U.S. market) and in large scale ventilation/gas moving equipment the company is now poised to make a big impact with a design of uninterruptible power supply (UPS) based on combined synchronous motor and generator stator windings and a common rotor.

will always supply clean, continuous 50Hz power. Furthermore, such a system, ideally, will never break down.

An early approach, still quite widely employed, uses a DC motor with its shaft coupled to an AC generator. The motor is normally fed by DC power obtained by rectifying the input mains.

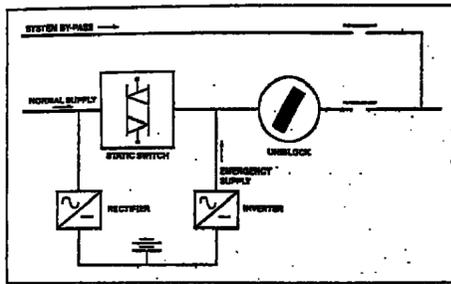
When the mains fail completely, a battery is automatically switched in to replace the absent rectifier output. In either event, the AC generator continues to supply the 50 Hz output which is clean since only a mechanical shaft connects motor and generator.

Use of a flywheel on the shaft allows short mains "drop-outs" to be accommodated from the stored flywheel energy.

Many of these equipments are in use, but they are noisy and bulky and not too efficient (about 85 per cent). But they are reliable, says Piller, and popular in emergent countries since they have no complex electronics to service.

The other major technique of which Piller is not a strong proponent, although it has the small defence business — is the all-solid-state static inverter.

As before, DC is derived either from rectified mains or a battery and the inverter reconstitutes the AC with some harmonics that are reduced by suitable filters.



Windings. With the input winding fed from the three phase mains, the customary rotating magnetic field is created, causing the DC excited rotor to spin in synchronism with the field.

What amounts to a transformer effect occurs between the input and output windings on the stator. Furthermore, by feeding the rotor with DC derived from the machine output via rectifiers, the power transferred from the input to output stator windings can be controlled and stabilised.

Quite large mains input changes are not passed to the stator output windings.

In practice, even mains drop-outs lasting up to about 50 milliseconds cause no loss of output due to the "ride-through" flywheel effect of the rotor which is larger and has more inertia than it would otherwise have for its power rating, due to the need to accommodate two winding systems.

High voltage spikes and mains frequency variations are similarly reduced.

For complete no-break protection, an automatic solid state switch (see diagram) activates a battery/inverter system, converting battery DC to 50 Hz AC. In the new Piller system about 5 per cent of the total power is diverted through this path during normal operation, providing a proving circuit and charging the batteries.

Reliability. Such systems are compact, lightweight and less noisy than motor generator systems. But, claims Piller, the component count in the electronics is often so high that good relative reliability is not obtainable.

Indeed, according to Klaus Sachs, Piller's technical director, this will probably always be the case in spite of improvements in component reliability; there are just too many of them.

In addition, he points out, that suitably qualified engineers are needed to service such systems.

For these reasons, Piller has introduced hybrid systems, the latest of which is the Uniblock, a kind of combined motor and generator in one machine.

The Uniblock consists, essentially, of a stator in which alternate slots are wound with input and output

reduces the transmission of harmonics through the system giving a purer sine-wave output. These harmonics coming in on the mains input produce their own faster rotating fields, but they are removed by special damping windings that have no effect at 50 Hz.

If the Uniblock is seen as replacing a DC motor, a flywheel and an alternator (total of six bearings) with one machine having only two bearings, then it can be seen why the efficiency rises to about 82 per cent, says Piller.

Uniblock has taken about four years to develop and prototypes have been extensively tested for about two years. While the company admits that this is not long enough for in-depth reliability studies, it estimates that the mean time between failures should be of the order of 15 years.

This, it claims, compares with about nine years for motor/flywheel/generator arrangements and two years for all solid state systems.

Piller executives are convinced that there is already a move away from solid state systems: presumably with Uniblock they intend to punch the message home.

Flame retardant. TECHNOLOGISTS at British Vita has developed a new foam material, which they say, has unparalleled qualities of flame retardancy. It is also, they say, resilient, comfortable and durable.

Called Vitafoam VFR, the material will not support combustion and will protect inflammable materials around which it is wrapped.

Message. The design of the inverter is simple and reliable, says Piller—it uses only six thyristors.

The Uniblock design also

AFTER A period in which it made an Applelike micro-computer called 2020, ITT has now come out with its own design of system based on the eight bit Zilog Z80A or the 16 bit Intel 8086. It is designated ITT 3030.

The 2020 has been dropped. "But," says Mr F. H. Hanna, ITT Consumer Products managing director, "it did provide us with hard, expensive and difficult experience that prepared us for the move to this next stage."

Although ITT has joined a crowded market, Mr Hanna believes the 3030 will score over the others because, he claims, it has many of the attributes of a minicomputer with the exception of the price.

For ITT the computer might be said to have turned full circle. Those who are old enough will remember the Stantec Zebra of the early '60s, an admirable machine in its time, designed by Standard Telephones and Cables, ITT's main UK subsidiary.

But edicts from the very top of the corporation effectively stopped all computer development in the mid-'60s, on the premise that ITT was in telecommunications, not computing.

In the last 10 years, however, it became obvious that telephone exchanges were fast turning into specialised computers; expertise had to be rebuilt.

Thus, the corporation seems once again ready to offer commercial computing products — the new 3030 has been designed by STL Harlow in the UK and is being built by ITT subsidiary, Standard Electric Lorenz in Germany.

UK micro-software house MP&L has written business application packages to perform on the BOS operating system — which has been proven in multi-user minicomputer systems. But the machine can also operate under CP/M, DEC's now widely accepted standard for micros.

Upgraded. Various printers can be connected via an RS 232 port and there is a standard output to a video monitor.

The system can be expanded easily. By taking out one printed circuit board and inserting another, the processor can be upgraded from eight bit to 16 bit.

Similarly, the internal memory can be enlarged from the basic 64k bytes to 256k bytes. The floppy discs can be enhanced to 1120k bytes and, via an additional interface card hard disc to 10 megabytes can be employed.

Other buses — S-100 and the IEEE 488 — can be supplied, as can an adaptor to allow an ordinary TV set to be used instead of a monitor.

By adding a further card, the 3030 becomes a multiuser computer fully supported by the BOS operating system. Up to four users can access files or undertake processing simultaneously.

Lead house for the project in the UK is ITT Consumer Products (UK) of Chester Hall Lane, Basildon (0268 3040), which will be distributing the product through microcomputer dealers and software houses.

The Business Systems Group of Brighton will look after bulk supplies to large companies. The computing will be carried out through the same routes. GC

Isolation transformer range. STABILAC, a range of TRX ultra isolation transformers has been announced by Claud Lyons, Hoddesdon, Hertfordshire (09924 67181). These are designed to protect computers or other equipment from voltage transients, spikes or free supply line disturbances.

The series is available as free-standing units with two tonne finish to blend with office decor. A brochure is available from the company.

Foundry resins range

ALPHASET TPA-2, an addition to its range of alkaline phenolic resins has been introduced by Borden (UK), North Baddesley, Southampton (0703 732131).

Borden says that the TPA-2 range has reduced viscosity making it easier to mix and ensuring good distribution over the sand grains. The grade can be used to bond alkaline and poor quality sands as well as high silica content foundry sands.

High strength moulds and cores can be made in cure times from three to 45 minutes.

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**Temperature controller**  
A temperature controller, the MC30/ID with liquid crystal display, metal case, plug-in construction and freedom from RT interference, has been introduced by West Instrument International Division of Gubna Industries. Technical details from 0273 606271.



Air-powered coil nailer for pallet makers

AN ADDITION to its range of soft woods of round head, plain, galvanised and ring shank nails up to 75 mm, it is claimed to be ideal for pallet crate and case making.

Full technical details from BEE at Aylesbury, Bucks (0296 81241).

BUILDING AND CIVIL ENGINEERING

Laing has £40m

A BATCH of new contracts for John Laing Group covers projects for Spanish arm Laing SA, and the company's Scottish region, all together worth over £40m.

More than £30m worth in Spain includes a £9.2m 1.6 kilometre long road tunnel with 10 kilometres of access roads and two main junctions in the Pyrenees, in association with OSSA and Padros, for Tunnel del Cadi, Concesionario del Estado SA.

Another £7.5m project is for 312 apartments near Marbella for Patrilla SA.

At Teruel—about 200 kilometres east of Madrid—a new 31,800 square metre hospital is to be built for the National Welfare Institute under a £4m contract, and a further £2.3m hospital award for the same client at Denia, Alicante. Contracts totalling £2.3m are for extra works to two existing Laing contracts at Gran Hospital, Madrid, and Alicante hospital.

An 850-metre railway tunnel at Castellbisbal near Barcelona is to be excavated and bridges constructed, under a £2.7m award by RENFE, the Spanish state railway company.

Also near Marbella, 48 houses will be built at the Grande

Major sulphur plant

WIDELY USED for making agricultural fertilisers, sulphur is considered very important in Saudi Arabia where a major handling, processing and facilities project is under way in the eastern province.

Wimpey ME and C has been awarded the lump contract for the engineering and procurement of equipment and materials for the scheme, and AMEC—jointly owned by ME

What's new in building

INTENDED to minimise the danger, damage and expense of fires occurring in chemical plants, oil refineries and power stations is Darshield fire-protection system developed by Darshield Engineering of Stockton-on-Tees, Cleveland, UK (0740 30461).

This comprises lightweight, ready-to-fit insulation enclosures made to meet clients' specifications and engineered to suit the equipment they protect and the space available on site.

No special tools are needed to install the panels, which are removable for routine inspection of the protected equipment.

The company says that the stainless steel construction enables the assemblies to stand up to the effects of weather and environment as well as repeated exposure to minor fires.

McAlpine dam in Portugal

CONSTRUCTION of the Beliche Dam located in the Algarve region of Portugal has gone to an associated company of Sir Alfred McAlpine and Son, Constructores A. Sulpico S.A.R.L.

Awarded by the hydraulics services division of the Portuguese Ministry of Habitation and Public Works, the contract is worth 342bn escudos (£2.8m) and involves constructing a clay cored earth dam of about 1bn cubic metres, a diversion tunnel, low-level discharge, overflow spillway and access roads. The project will take around three and a half years to complete.

A board for all seasons

THE DEVELOPMENT of wood-based construction materials with cement bonding began half a century ago and the aim has always been to combine the benefits of the two materials and reduce their individual disadvantages.

There have been numerous attempts to produce a good quality particle-board over the last few decades but, unfortunately, most of these resulted in a rather inferior product.

Potentials. The Swiss soldiered on with research and development of a dense board with good mechanical performance, because they recognised the potential in the construction industry for a durable, strong and fairly cheap sheet material.

The result was Duripanel, AC's wood-cement particle board, Duripanel, widely used for some years throughout Europe and now about to be produced in the UK.

Smooth, fine grained with a cement enriched surface, the board is non-combustible, resistant to water, humidity, fungi and termites.

It is offered, not necessarily as a competitor or a replacement for chipboard, but as a versatile building material with a wide number of applications.

Particularly suitable for external cladding, due to its good weathering properties (the sawn edge may be left unprotected), it is suggested also as an interior wall lining, especially in public buildings, because of its fireproof qualities.

As plate-shaped construction elements, however, these panels will serve mainly for the division of rooms and the covering of surfaces. The maker claims that the board has outstanding resistance to weathering and humidity which makes it ideal for use outside, as well as near or in the ground, in wet

Combats noise

A sound-proof door made in alternative materials (usually a sandwich combination of, for example, lead/asbestos/steel) could cost between £500-£700—Duripanel says it can give the equivalent at a third of that price range.

Now the panels are to be made in the UK where the British licensee is taking a site, either in Wales or Scotland. This manufacturing unit will employ about 45 people and will be geared to produce 100 cubic metres a day.

Gone will be the expense and delay in transportation of the panels from Europe which will be distributed in this country by Mallinson-Denny (Lydney) of Gloucestershire.

Duripanel will be readily available in thicknesses 6-40 mm (maximum density panels offered as actual load-bearing walls in certain construction projects) in sheet sizes 2,600 x 1,250 mm and 3,100 x 1,250 mm.

Easily cut without any special tools, the panels can be painted, stained, veneered or covered with GRP, in agricultural applications — as chicken runs, cow byres, pig styes — they can be left in their natural finish.

More from Duripanel UK, The Manor Yard, Great Shefford, Newbury, Berks (0488 39 612). DEBORAH PICKERING

Brignell housing schemes

CAMBRIDGE BUILDER John Brignell has received £3.3m worth of new work covering five different contracts. Largest scheme is valued at £1.1m for completion of 80 flats for the Granta Housing Association in Shelly Row at the top of the city's Castle Hill.

At Cambridge's Ditton Lane Estate, a £1m scheme is for the completion of 62 new houses and

Sri Lanka bank job for Sunley

THE DESIGN and build package for Grindlays Bank in Colombo, Sri Lanka has been won by Bernard Sunley on a £4m turnkey contract.

This involves building a new 7 storey premises to replace Grindlays' original office destroyed by fire in 1980.

The new building will be of reinforced concrete construction with air conditioning, two lifts and an escalator serving the main banking hall.

Kirk work

CHARLES HILL, subsidiary, Kirk, has new work worth over £21m.

A new warehouse for Silentnight at Nelson, Lancashire, is valued at £794,000; seven industrial units at Bedminster, Bristol, bring in £900,000; and Broken Scar water treatment works at Darlington (£367,000) are awarded by Northumbrian Water Authority.

An advance factory at Ingleton in Yorkshire, for EIEC is worth £164,000; and other jobs cover £21,000 worth at the North West Water Authority's drainage and pump house at Southport, roads and drainage in Clitheroe (£118,000) and a factory for Rosendale at Bacup (£112,000).

Leech joint venture

A £11M joint venture housing project will be carried out by Leech Homes (North West) with Manchester City Council for the provision of more than 60 new homes on a cleared site at Old Elm Street, Chorlton-on-Medlock.

The new units will be a mixture of one, two and three bedroom homes at prices from about £15,000 to just under £21,000. They will be offered to seven different categories of potential owners, including being put on sale to the general public.

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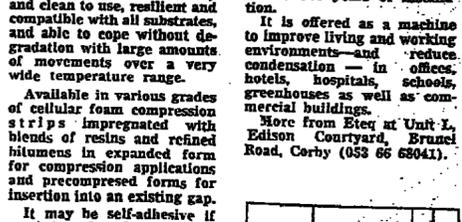
**Sri Lanka bank job for Sunley**  
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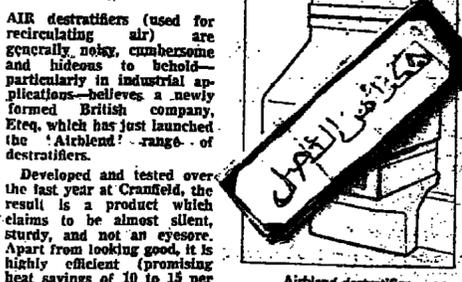
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The Darshield system undergoing a fire test (left), and the system fitted around the actuator it is protecting.



SLOTSEAL FORMBAND is a new sealant said to be easy and clean to use, resilient and compatible with all substrates, and able to cope without degradation with large amounts of movements over a very wide temperature range.



AIR destratifiers (used for recirculating air) are generally noisy, cumbersome and hideous to behold—particularly in industrial applications—believes a newly formed British company, Eteq, which has just launched the 'Airblend' range of destratifiers.

ANGLO  
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PAPER



THE MANAGEMENT PAGE

EDITED BY CHRISTOPHER LORENZ

# The dilemmas of an extended flight path

Moving into international operations has presented Air Zimbabwe with a series of problems. Nicholas Leslie reports

IN AN era when wide-bodied aircraft are the automatic choice of flagship for national airlines, one carrier has been studiously avoiding an independent route.

Air Zimbabwe operates narrow-bodied Boeing 707s on its international routes. It has done so since it first began its non-stop service to the UK in April, 1980, just before independence, and will probably continue to do so until 1983 at the earliest.

Its avoidance of wide-bodied aircraft was based on commercial considerations rather than financial necessity—ways and means can always be found to operate these expensive aircraft even if, like Zimbabwe, a country has an acute shortage of foreign exchange.

Air Zimbabwe decided, however, that it would be more prudent to test the level of passenger demand before committing the airline to capital expenditure of a magnitude that would not only be daunting but would totally alter the pattern of financing and operation that had been adopted during 15 years of UDI.

At the same time, its decision can perhaps be seen as an act of faith in the country's future. For the belief clearly is that if Zimbabwe remains politically stable and its economy expands, Air Zimbabwe should be able to move into line with other national carriers, yet remain on a commercially viable basis.

In the transitional years—1979-80 and 1980-81—to full independence of the country, Air Zimbabwe's growth reflected its move into the international arena. Passengers carried rose from 365,771 to 402,274, but passenger kilometres flown jumped from 258.47m to 431.4m and cargo tonnes per kilometre flown rose from 2.5m to 5.14m. The 1979-80 profit was Z\$330,488. The 1980-81 results have yet to be published.

Formidable obstacles lie in the way of belief becoming a reality, however. The airline is attempting to establish itself, at a time when the growth has gone out of the international air travel market. Costs are rising inexorably, particularly for fuel, which represents one of the biggest single costs of any airline. Air Zimbabwe has to face immediate competition from the national airline of any country into which it flies since reciprocal flying rights are obligatory—and those airlines will probably be flying more modern aircraft, certainly on international routes. A very big marketing exercise is required in all areas where Air Zimbabwe is opening up new routes.

## Logical

To date, Air Zimbabwe has undoubtedly performed remarkably well. Starting with one Boeing 707 leased from South Africa, it began in April 1980 a service three times a week from Salisbury to London's Gatwick Airport. Today, it has three 707s which it bought early last year from Lufthansa, the West German airline, for \$1m (including spares) with a loan raised overseas.

There are now four flights a week, one of which includes a stopover in Frankfurt. The West German service was seen as a logical expansion because Frankfurt connects with most places of importance throughout the world, says Mervyn Eyett, general manager of Air Zimbabwe.

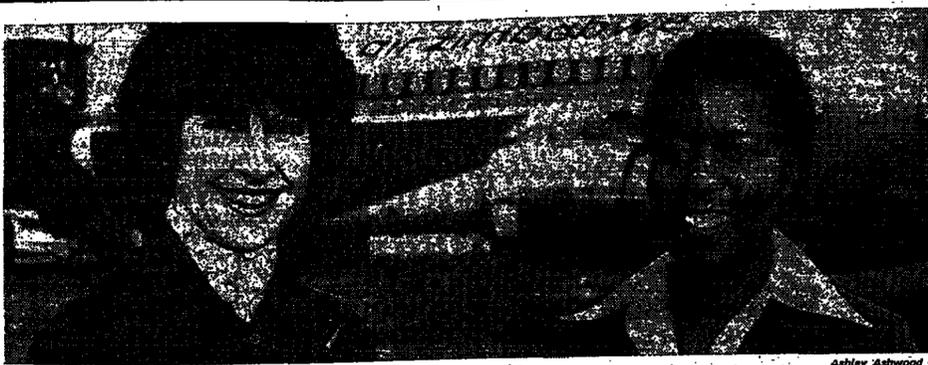
The businessman is seen as the cornerstone of passenger growth—as with so many airlines—though the opening up of Zimbabwe to tourists is high on the list of priorities. As Eyett remarks of the Frankfurt stopover: "Germans are great travellers in East Africa; I hope that a few will extend their

visit to here." Nevertheless, any stopover—and more are planned—presents something of a dilemma. Air Zimbabwe has adapted two of its three 707s for use on long-haul routes of over 10 hours. But each intermediate landing and take-off can endanger the profitability of such routes.

While these aircraft are being used, therefore, the airline's priority must be to concentrate on long-hauls when opening up any new international service, says Eyett. Such an approach takes on even greater significance in view of the fact that Air Zimbabwe has to pay more for its domestic fuel supplies than any airline operating to or from Africa. This is a result of the high costs of transporting oil to this landlocked country. The airline hopes the situation may improve when the oil pipeline from Beira, in Mozambique—out of action since shortly after UDI—reopens.

Nevertheless, Eyett maintains that the London route is operating profitably. Though payloads were lower than expected in the early months it has for several months now been achieving passenger payloads of at least 75 per cent capacity in both directions. Cargoes have not been as healthy, particularly on outward flights from Salisbury, but Eyett believes there should be a steady improvement. This is clearly of significance since 707s are designed to operate as passenger/cargo carriers rather than predominantly passenger aircraft.

One unfortunate and costly aspect of the distance between Salisbury and London is the flying time of 10½ hours, non-stop. International regulations require a back-up captain and flight engineer on 707s for any flight over 10 hours' duration. And, as with other operators, staff represent the second biggest cost the airline has to bear after fuel.



Ashley Ashwood

THE major programme being undertaken by Air Zimbabwe is being tackled against a political background that requires a rapid integration of blacks into operational, administrative and top management positions that have previously been the domain of the whites. In part, this has been achieved with apparently little upheaval or unrest. For example, according to Mervyn Eyett, Air Zimbabwe's general manager, the transition from whites to blacks in the accounts department was achieved within a few months of independence.

Recruitment for reservations and traffic handling staff has also been predominantly among blacks. Equally, the number of black stewardesses has risen rapidly, though this has largely been a case of new recruitment necessitated by the launch of more regional and international services

Eyett says it is recognised that if Air Zimbabwe is to compete on equal terms with other national carriers like British Airways and Lufthansa it must eventually move into wide-bodied aircraft. The cost, though, is enormous—running into tens of millions of dollars for not only the aircraft but for an engine testing cell and other back-up equipment.

Various strategies are therefore being considered to defray the expense. One option is leasing. Another is a partnership with a nearby African country in a similar economic position to Zimbabwe—a course of action, though, that revives

## Personnel priorities

rather than replacement. Indeed, Eyett says that stewardess recruitment presented one of the biggest problems in meeting the schedule for the April 1980 launch of the Salisbury to London route.

Where anxiety does undoubtedly exist is in the technical areas—ground crew and flight crew. There is a conviction among many whites that it is impossible, in the time scale contemplated to train blacks up to the level of technical competence they consider is necessary to keep the fleet of eight Viscounts and three jet-powered Boeing 707s in service and to take on Boeing 707s, and eventually, wide-bodied aircraft.

This view has been fashioned partly by 15 years of UDI and

memories of the difficulties that finally split East African Airways.

Meanwhile, even the cost of Air Zimbabwe's training programme is a financial strain which the airline may try to ease by persuading other airlines, probably in Europe, to help train its apprentices and even pilots.

Training is crucial both to the airline's ability to expand and to its prospects of gaining revenue by servicing aircraft for other airlines. At present, it provides only transit checking for BA and Lufthansa, though it does have other engineering work such as servicing Dart engines for Air Tanzania.

The impact of international operations on Air Zimbabwe's revenue has been swift. Before the introduction of the fourth service to London and the

Frankfurt stop, international flights were generating some 33 per cent of total operating revenue, while 67 per cent was earned from domestic and regional routes to Zambia, Malawi, South Africa and Kenya. Revenue from international flights now exceeds 45 per cent of the total.

Until Air Zimbabwe gets its wide-bodied aircraft it is enticing passengers on the London route with more non-stop flights than BA (which has only two) and a standard of comfort and service that it reckons more than matches those for like classes of passenger in other airlines.

But the one stumbling block to growth may be Salisbury Airport. Facilities are clearly not designed to handle the 350 or so passengers disgorged by jumbo jets and on this basis a new terminal would seem to

be a priority—though this may not be so for a government with a whole host of priorities and limited funds.

Meanwhile, Air Zimbabwe with its smaller aircraft would seem to have the advantage in terms of the speed with which its passengers can be handled, in addition to the frequency of its flights.

Eyett predicts that a wide-bodied service will be introduced sometime in 1982—well in advance of noise regulations that may force 707s out of Europe within the next five years.

But Eyett will continue to look hard at the economics of a move to wide-bodied aircraft and is strongly of the opinion that the frequency of services would probably have to be reduced until a growth in passenger traffic justified an increase.

## Management abstracts

The board and compensation. F. W. Cook in Compensation Review (U.S.), No. 2/81: p. 37. (5 pages, table)

Describes the role of a board compensation committee; outlines the relationships, job characteristics, responsibilities, and traits of a compensation director; recommends a schedule for, and the content of, committee meetings

Alternatives to a visual display unit. K. Jones + others in Computer Weekly (UK), 23 May 81: p. 17 (3 pages, illus)

Three articles describe methods of computer data input which are said to eliminate the need for a visual display unit: 'hand-print' data entry pads, optical character recognition, and the use of a barcode. Each article expounds the virtues of a particular technique, each of the first two mentions products, and the third concentrates on the security of confidential data.

Computers as terrorist targets. A. Segerdahl in Computing (UK), 14 Jun 81: p. 20 (2 pages)

Discusses the possibility of terrorist attacks on EDP installations; and relates experiences in Continental Europe; presents advice from a police crime prevention officer.

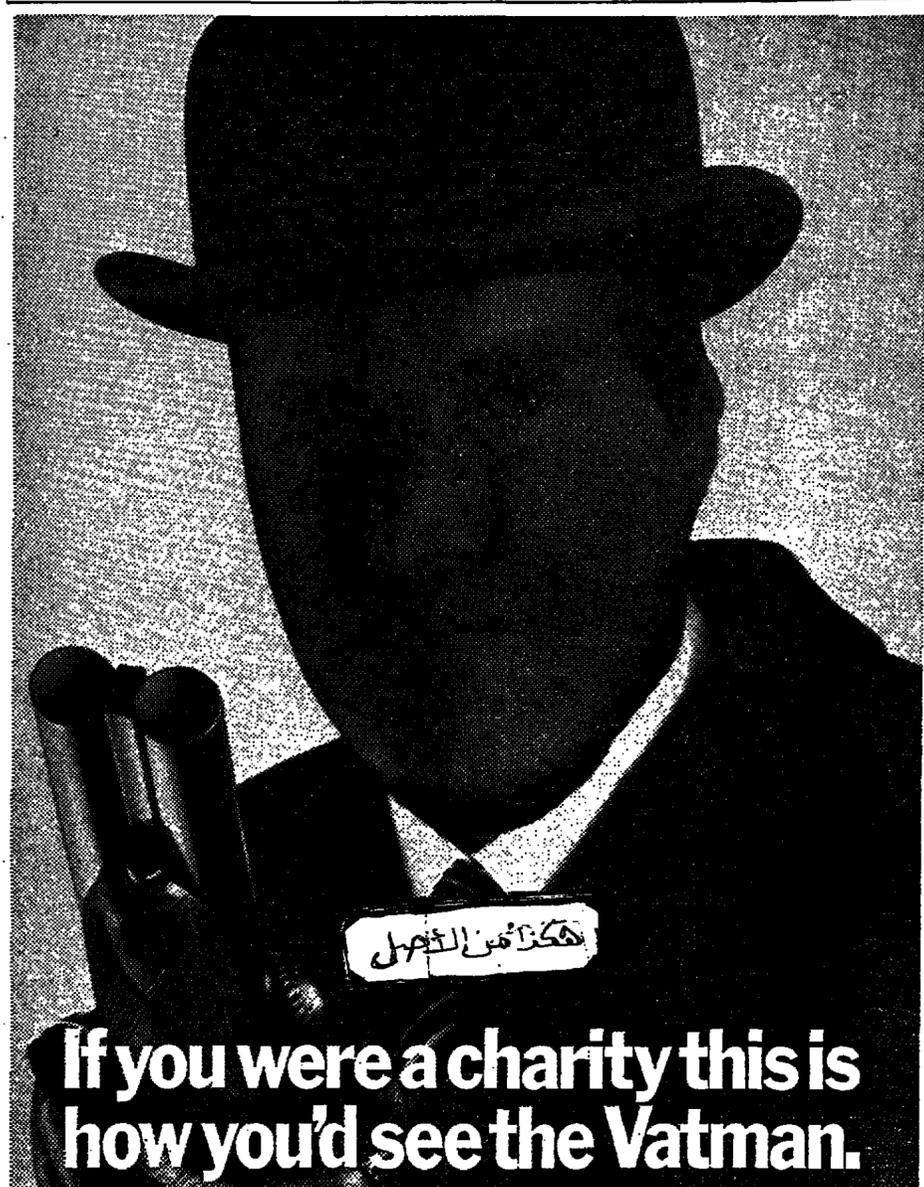
Encryption. I. Berkovich in Business Systems and Equipment (UK), Jun 81: p. 28 (4 pages, diag.)

Defines encryption, i.e. ciphering; data transmitted through electronic channels vulnerable to eavesdropping; explains how it works, and reports on Trustee Savings Bank's investigation into applying it to their cash dispensers in order to prevent unauthorised access to customers' account numbers.

Controlling computer costs. J. E. Finney in Journal of Accountancy (U.S.), Apr 81: p. 63 (4 pages)

Suggests that the best hope of reducing costs in a centralised computer department is to make users aware of the costs of the services they take; discusses ways of charging departments, and favours a method which uses prescribed rates per unit of time for each service or cost centre.

These abstracts are condensed from the abstracting journals published by Anbar Management Publications. Licensed copies of the original articles may be obtained at £2.50 each (including VAT and p and p; cash with order) from Anbar, PO Box 23, Wembley HA9 9DJ.



If you were a charity this is how you'd see the Vatman.

Like other charities, The Spastics Society is burdened with VAT. This year we will pay about £300,000. Why should an organisation totally devoted to the care of the disabled be crippled in this way?

The money that we get is spent providing essential care—services which would otherwise have to be provided by central or local government—probably at much greater cost!

Local authorities can recover VAT, commercial companies can recover VAT—why, therefore, shouldn't charities be able to recover VAT. If you think this unfair burden should be lifted, the Society would greatly appreciate it if you would write to your MP.

## The Spastics Society

12 Park Crescent, London W1N 4EQ. Telephone: 01-636-5020.

## Business courses

Changing Technology—A Director's Responsibility, London. February 2. Fee: £95 (plus VAT) members, £125 (plus VAT) non-members of the Institute of Directors. Details from Education Director, Institute of Directors, 116 Pall Mall, London SW1Y 5ED.

Profitability and Productivity Analysis, London. February 16-17. Fee: £180. Details from Department of Management Science, Imperial College, Exhibition Road, London SW7 2BZ.

World Coal in the 1980s. London. February 2-3. Fee: £218 (inclusive of VAT). Details from European Study Conferences, Kirby House, 31 High Street East, Uppingham, Rutland, Leicestershire LE15 9PY. The Factory of the Future, Brussels. February 8-10. Fee: BFp 32,000 members, BFp 36,000 non-members of the American Management Association. Details from Management Centre Europe, avenue des Arts 4, B-1040 Brussels, Belgium.

Management of Innovative Projects, Slough. March 8-12. Fee: £345 (plus VAT). Details from the Registrar, Urwick Management Centre, Baylis House, Stoke Poges Lane, Slough, Berkshire, SL1 3FF.

The Directors' Workshop, Henley. February 24-26. Fee: £285 (plus VAT) members, £445 (plus VAT) non-members of the Institute of Directors. Details from Education Director, Institute of Directors, 116 Pall Mall, London SW1Y 5ED.

Growing Pains—resolving the problems facing international banks of establishing and developing a physical presence in the City of London. London. February 25. Fee: £65 (plus VAT). Details from Office Planning Consultants, 6 Mercer Street, London WC2H 9QG.

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Total Audience			1,746,000

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AFRICA/MIDDLE EAST	publication	country	readership
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ALAM AL IDARAH	monthly	In Arabic	336,000
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Paris: Lorraine Benoit-Lucy (District Manager), 17 rue Georges Bizet, 75116 Paris. Tel: 720-3542

Milan: Vivien James (District Manager), 1 Via Benacchio, Milan 20122. Tel: 86-99-617

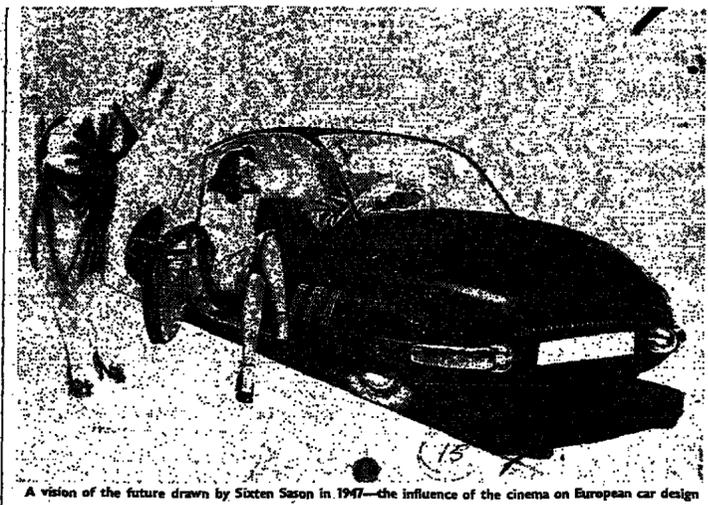
# Elizabeth Hall Eight Decades

by DOMINIC GILL

The decades of the 1890s, 1970s and the two years of the 1980s were those represented at last Friday's concert—the third of five promoted on the South Bank between October and May jointly by the BBC and the London Orchestral Concert Board under the collective title of "Music of Eight Decades".

In theory, it looked to be a promising programme: three recent pieces, including a premiere, by three British composers still in their early thirties framed by a pair of key works from the 1950s by Elliott Carter and Luciano Berio. In the event, it was certainly not the performances by the London Sinfonietta—all without exception of remarkable energy and high polish—which rivaled the evening from catching fire. The fault lay rather with the programme itself, strong on paper, but in sound curiously unconvincing.

But sensitive new music programming in any case, at the best of times, is a thankless task. It would have been difficult to predict how powerfully Carter's early sonata for flute, oboe, cello and harpsichord would overshadow the rest of the evening; and how nothing afterwards would match its toughness, incisiveness and broad lyrical sense. The sonata is a marvellous work, a much-neglected landmark both of its decade and of Carter's oeuvre. It is a work of confidence. Besides it, the four succeeding pieces, including the Berio, seemed no more than scribbled essays, worthy and decent



A vision of the future drawn by Sixten Sason in 1947—the influence of the cinema on European car design

# Architecture Designing ways

by COLIN AMERY

When the poet Cowper wrote about a God who "treasures up his bright designs" I don't imagine he was thinking of Terence Conran, or even of the Victoria and Albert Museum. Mr Conran has been quietly working what to do with all the money he has made from all the bright designs he has been selling at Habitat shops.

He has now taken over from Sir Roy Strong as a latterday Prince Albert and opened his design museum and study centre in the former boiler-house of the V and A. Prince Albert and his diligent partner Sir Henry Cole had similar aims to those of Mr Conran when they planned the South Kensington Museums. The Prince was aware Britain was losing her industrial ascendancy over other European countries and he never intended the V and A to be another High Art Museum but a place where students and manufacturers could look at and emulate a rich variety of objects of the highest quality.

Mr Conran has put some of his profits into The Conran Foundation which is an educational charity devoted to the improvement of industrial design. He has refurbished the V and A's boilerhouse, in the yard between the main museum building and the Huxley building, with an independent entrance on Exhibition Road, as the first base for the Foundation and as a home for a series of temporary exhibitions.

It is at the V and A but not of the V and A. The purpose of the Foundation is not to add to the attractions of the V and A but to provide facilities for designers and manufacturers; indeed Mr Conran said last week that "it's not for the general public".

Despite the solemn intentions behind this project there is no doubt that London has acquired a powerful new design centre that could be an important influence on manufacturers, but could also attract the public in large numbers. Mr Conran doesn't seem to mind the public popping into Habitat so he shouldn't discourage them from his new realm.

The new gallery is a wonderful period piece. It is a long time since I have spent so long in an all white room, with white tiles on the floors, white walls and white waffle ceiling. The attendants at the opening looked like the staff of a well known London dressmaker—indeed Ricci Burns was on to the all-

# Wigmore Hall Brüggen & Tilney

by PAUL DRIVER

The Dutch musician Frans Brüggen is accepted as being the world's finest recorder player, so one need not be surprised that for his recital with the harpsichordist Colin Tilney on Thursday—a promotion of the Early Music Centre as part of the Early Music Network—the Wigmore Hall was packed almost to the exclusion of music critics. And there was no question but that the enthusiastic audience was rewarded with playing of the utmost vibrancy and flair. One's only real criticism was that the programme was too slender: four enjoyable items imparting a light and modest tone perfectly in keeping with Brüggen's approach to virtuosity.

The theme was the development of the baroque sonata, exemplified in a progress from six assorted 17th-century sonatas by unfamiliar 17th-century composers, through an arrangement of a Corelli violin sonata (G minor, op 5 no 7), the wonderful E minor harpsichord sonata of C. P. E. Bach, to another arrangement, Mozart's G major sonata K 301, originally for violin and fortepiano. The first two parts were a charming demonstration of the under-appreciated dynamic, tonal and commanding possibilities of the recorder family, leaving no room

for thoughts of inappropriateness in the Corelli.

Colin Tilney's account of the Bach sonata did make one want to cry. His first movement had correct buoyancy but no excess of neatness, as if to imply that the rough expressive-daring of the music could be compounded by roughness in the execution, whereas the reverse is true. He was alive to the witfulness and push of emotion in the slow movement and then his finale was marked by further lack of absolute finesse (the only kind) though it spoke.

The Mozart arrangement was the joy of the concert. The partnership was impeccable, feisty, like Brüggen's aqueous alto phrasing (now he was playing on a transverse flute) and Tilney's delicate sprinklings of treble tone being mutually respected as well as individually displayed. Mozart was most engaging in this, thus that it ever is in violin and piano, and the combination of flute and harpsichord is a more successful one than flute and piano. Mozart began writing this sonata for flute and harpsichord in fact, so Mr Brüggen has thwarted him. But if he could have bathed in Brüggen's limpid world of sound even the fluting composer would surely have approved.

**THEATRES**

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# Covent Garden Manon by CLEMENT CRISP

The return of *Manon* to the Royal Ballet repertory on Saturday night in an uneven performance suggested how easily familiarity may breed contempt among interpretative artists. The principals of the occasion—Merle Park and Wayne Eagling as the lovers; Michael Coleman and Monica Mason as Lescout and his mistress—are an assured quartet; the company has shown that, in MacMillan's full-length spectacles, their ensemble playing is vital, and is always vitally well done.

Yet I noted a lack of coherence, a tendency to elaborate portrayal to a point of self-parody (rather than reduce it to an essential image of character) which gave the presentation an over-ripe and indulgent air. I do not recall the trio of Gentlemen looking quite as Dutch Dollish in their maquillage before; nor such desperate fuss with handkerchief and grotesque make-up, snuff-box and centre-stage mugging, from supernumeraries. Michael Coleman made Lescout an unshaven scoundrel, and I have never before been aware of him rifling G.M.'s pocket during the first scene in des Grieux lodgings; the opportunist charm of the role was lost in predatory ferocity. The squabbling between the whores seemed broader than heretofore, and certain dance performances looked undisciplined; neither Wayne Eagling nor Michael Coleman were at their clearest in technique, though the stretch of Mr Eagling's line, and the vulnerability of his emotions as des Grieux, show us the continuing appeal of his portrait of an innocent who finds himself dragged headlong into suffering and crime.

I sensed only intermittently the dramatic impulse behind Merle Park's view of Manon. In the first scene this Manon appeared all too conscious of her powers, with none of the bloom of girlhood or that innocent sexuality that makes her so irresistible to every man who sees her. Yet there has rarely been a more passionately yielding account of the effulgent duet which interrupts des Grieux writing of the letter to his father. The performance reached a magnificent peak here as the lovers were impelled on a long, swooning wave of feeling like surfers, they coasted gloriously on its crest.

Nothing in the rest of the evening came near this in intensity or involvement until the final pas de deux, where Miss Park's faltering steps had a terrified momentum, as if Manon felt herself racing headlong into oblivion, and Mr Eagling surged desperately to sustain her.

I record with pleasure that the recent super-charged revisions by John Lanchbery to the score were not in evidence; the original Leighton Lucas arrangement of Massenet is

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## Competition and the banks

THE MONOPOLIES Commission's report on the two rival bids for Royal Bank of Scotland is remarkable for its lack of emphasis on competition. It makes no attempt to analyse the effect on performance, profitability and service to the customer of the mergers of the 1960s, which made the British banking industry one of the most concentrated in the world. Yet this is the context in which any bid from an outsider should be considered.

It may be that, even after such an analysis, the Commission would still have concluded that a change of ownership for Royal Bank and its English subsidiary, Williams and Glyn's, would make no difference to competition. But the panel might have given more weight to the possibility, stressed by one of the two dissenters, Mr R. G. Smethurst, that either bidder would give a competitive boost to Williams and Glyn's. As Mr Smethurst pointed out, "The fact that both bidders have a background in retail banking outside the narrow group of London and Scottish clearing banks is an added attraction."

**Morale**  
Instead, the Commission devotes a large part of the report to the "Head Office" question—the effect on job opportunities in Scotland if one of its largest companies is controlled from outside the country. The report says either merger "would reinforce the impression of a branch economy and diminish confidence and morale in Scottish business."

The disappearance through takeover of independent decision-making centres may have affected the quality of employment in some of Britain's towns and regions—in contrast to Germany and the U.S. where Head Offices of large companies are spread more widely. But if the "branch economy" argument is to be used to block mergers, it must be applied consistently—not only in Scotland but in other parts of the country and not only by the Commission but by the Government in deciding which mergers should be referred to it.

The Scottish factor influenced the Commission in rejecting a foreign bid for Highland Distilleries in 1980, but in general the transfer of decision-making from one part of the UK to another has played almost no role in merger policy. As the other dissenter in the Royal Bank case, Sir Alan Neale,

remarked, the UK is an economic union in which resources are free to move to take advantage of available opportunities. He did not believe that banking mergers in order to retain particular levels of decision-making in Scotland "can make enough difference to the otherwise free play of trends and forces to be justified." In his view the role of the Royal Bank in Scotland and its service to the community would not be affected by the proposed change of ownership.

It is true that the Commission is required by the Fair Trading Act to pay regard to the "balanced distribution of industry and employment in the UK." But this has usually been taken to refer to factory closures rather than changes of ownership. The fact that four of the six panel members chose to put so much weight on this element illustrates once again the vagueness of the criteria laid down in the Act and hence the unpredictability of merger decisions.

The other main theme in the report concerns the Bank of England. The Commission did not share the Bank's anxieties about the difficulty of supervising a bank controlled from Hong Kong, but saw force in the argument that the transfer to an overseas owner of "a significant part of the UK clearing bank system" could create conflict of interests which might be detrimental to the UK. This was no more than a "presumption" in the Commission's view which might be rebuttable in particular cases—if for example a UK clearing bank was badly in need of fresh blood, a bid from overseas might be preferable to the status quo; the Commission did not think this was true of Royal Bank.

**Suspicion**  
Although a majority of the panel in the end endorsed the Bank of England's view that the bid from Hongkong and Shanghai Banking Corporation should not be allowed, there is nothing in the report to justify the remarkably strong reaction shown by the Bank at what it chose to regard as a challenge to its authority. The suspicion remains that in being too jealous of its powers the Bank risked weakening the system of information supervision which is its special pride. This rests on respect for the Bank's judgment, not on its assertions to be the sole authority on financial structures.

## Understanding Germany

CHANCELLOR SCHMIDT, and by strong implication West Germany, have been getting a bad Press recently in the U.S. as well as in France. Here, for instance, is a columnist of the New York Times commenting (second hand) on a dinner party given for Herr Schmidt and a collection of American guests by the German Embassy in Washington a week or so ago: "The Chancellor came across as 'nervous, petulant, self-deceiving and irresolute—a reflection of what some of the staunchest supporters of the Atlantic Alliance fear may be the state of his nation.'"

**Tensions**  
The immediate causes of a certain disenchantment with Herr Schmidt as an ally are the declaration of martial law in Poland and his reluctance to respond with sanctions against the Soviet Union quite as strong as the U.S., in particular, would like. Yet the tensions between the Federal Republic and the U.S. go back a good many years. Those with long memories will recall that the Germany of Konrad Adenauer used sometimes to be criticised in the U.S. for being almost too faithful to the Alliance and for being incapable of developing an eastern policy of its own.

That was the period before détente. More recently, the Germans have been blamed within the Alliance for failing to fulfil the Nato commitment to reduce defence expenditure by 3 per cent a year in real terms, for taking too narrow and central European a view of the world and for seeking almost a special relationship with the Soviet Union.

Before the latest tensions become any more serious, it is worth trying to look at matters objectively. For obvious reasons, West Germany entered the world scene late and with a reputation to live down. A decade ago it was not even a member of the UN. It is not, like Britain or France, a long-standing nation state. Its policies are very heavily influenced by geography as well as history. It is in the middle

of Europe and the German nation remains divided.

In the 1950s it was relatively straightforward. The prime goals were economic recovery and international respectability, the latter being achieved through membership of NATO and the Common Market.

Thought of rapprochement with the East was excluded by the Cold War.

By the 1970s, however, there were new openings. West Germany played its full part in the development of détente and began to assume a more international role. No less important, the Soviet Union recognised realities and dropped its attitude of outright hostility towards Bonn.

What has happened since has been the near breakdown of détente in East-West relations for reasons that were none of the Germans' making. The West German problem today is how to play a role in international affairs, compatible with the country's economic strength and with membership of the Alliance, that fosters rather than hinders East-West harmony.

It may be that it will prove impossible to find a satisfactory answer. Certainly the continued expansion of the Soviet military machine has not made it any easier. Yet in the meantime there is a case for listening more closely to what Herr Schmidt and his colleagues have to say about West Germany's particular dilemma of being caught between East and West, even though its political and economic sympathies lie overwhelmingly with the West.

**Healthy**  
Two developments seem to us rather healthy. One is that these matters are now being discussed more openly in the Federal Republic itself. Too often in the past there was a tendency to regard any dissent from conventional wisdom about East-West relations and the role of Germany as tantamount to disloyalty. The other is that Herr Schmidt is speaking more strongly within the Alliance. That should be a cause for dialogue, not irritation.

THE DISTINCTIVE bell-shaped insignia of American Telephone and Telegraph may soon start turning up in all sorts of unexpected places. On sophisticated office automation products, for example, or on personal computers. And, in a few years' time, perhaps, on the new generation of computerised information systems which will bring services like electronic banking to the home.

By freeing AT and T to compete outside the regulated telephone business, the anti-trust settlement which the company reached with the U.S. Justice Department 10 days ago foreshadows a massive upheaval which will extend well beyond the traditional frontiers of telecommunications. The reverberations will also be felt in such industries as computers, consumer electronics and publishing, both in the U.S. and internationally.

The settlement must still be approved by the federal judge in charge of the case and may also be modified by Congress. As it stands, it seems highly favourable to AT and T, which is required in exchange to shed within 18 months its extensive but commercially pedestrian local telephone company interests.

But the gains in the new era of competition opened up by the settlement seem unlikely to be all one way. Other companies, including such giants as IBM and Xerox, have long expected to have to confront AT and T directly one day and have been squaring off for the battle. Moreover, AT and T has still to show how effectively it can mobilise its vast financial and technological resources in fast-moving, high-risk markets.

Much of the immediate impact of the settlement is likely to be felt by the smaller companies which compete with AT and T in the long-distance telephone market. Known as specialised common carriers, they include MCI, an independent company based in Washington DC, and offshoots of International Telephone and Telegraph, Southern Pacific and Western Union.

These youthful companies operate their own microwave radio transmission networks, which connect with AT and T's local circuits. By charging as little as half of AT and T's tariffs and marketing their services aggressively, they have built up a fast-expanding business. Their combined revenues have grown in less than a decade to \$900m last year, against AT and T's long-distance revenues of more than \$200m.

In the short-term, they stand to benefit from the settlement. Removal of its local telephone monopoly will mean that AT and T will no longer have first choice of higher quality subscriber lines and will have to pay the same "access charge" as its competitors to connect with them. The smaller carriers will also be free to expand geographically and to extend their services to customers with dial telephones

## AT&T'S NEW AMBITIONS

# Squaring up for a fight

By Guy de Jonquieres

### THE MAIN TELECOMMUNICATIONS COMPETITORS

**AMERICAN SATELLITE**  
Provides voice, image and data communications via satellite. Owned jointly by Continental Telephone and Fairchild Industries. Owns 20 per cent of Westar satellite system. Turnover n.a.

**COMMUNICATIONS SATELLITE CORP**  
Holds monopoly of U.S. international satellite communication operations. Sole U.S. representative to Intelsat, of which it owns 23 per cent. 1980 turnover: \$300m.

**COMSHARE**  
Supplies computer services, telephone systems and data communications. 1980 turnover: \$71m.

**CONTINENTAL TELEPHONE**  
Major independent telephone company operating in U.S. and Canada. 1980 turnover: \$1.3bn.

**GENERAL TELEPHONE AND ELECTRONICS**  
Owns largest independent telephone system in the U.S. Other activities include manufacture of telecommunications equipment and lighting, operates data communications network. 1980 turnover: \$10bn.

**GRAPHIC SCANNING**  
Fast-expanding company founded in 1971. Operates U.S. data communications network, international telex and radio-paging services. 1980 turnover: \$432m.

**ITT COMMUNICATIONS**  
Part of ITT. Manufactures wide range of telecommunications equipment. Operates international services and U.S. long-distance telephone network, "Cytel". 1980 turnover: \$7.2bn.

**MCI COMMUNICATIONS**  
Offers long-distance telephone service between more than 100 cities. 1980 turnover: \$234.2m.

**MITEL**  
Rapidly-growing Canadian PBX manufacturer founded in 1973. Supplies British Telecom and is building large factory in South Wales. 1980 turnover: £511m.

**NORTHERN TELECOM**  
Canada's largest telecommunications manufacturer with successful international record. Also sells computer terminals and systems in U.S. 1980 turnover: \$2.1bn.

**RCA**  
Operates international voice and telex services and U.S. satellite communications services. 1980 turnover of these operations: \$253.5m.

**ROHM**  
Manufactures military computers and telecommunications equipment, notably PBXs. 1980 turnover: \$201m.

**SATELLITE BUSINESS SYSTEMS**  
Owned by IBM, Aetna Insurance and Communications Satellite Corporation. Offers advanced satellite communications services to companies in the U.S. 1980 turnover: n.a.

**SOUTHERN PACIFIC COMMUNICATIONS**  
Operates long-distance voice network and plans satellite system. Part of Southern Pacific group with interests in railways, freight transport and pipelines. 1980 turnover: \$152m.

**TYMSHARE**  
Major U.S. computer time-sharing company operating U.S. and international data network. 1980 turnover: \$235.5m.

**UNITED TELECOMMUNICATIONS**  
Second largest U.S. independent telephone company, sells equipment and data processing services. 1980 turnover: \$1.9bn.

**WESTERN UNION**  
Provides wide range of communications services, including telex, telegraph and satellite systems. Dominant telex operator in U.S., recently allowed to enter international market as well. 1980 turnover: \$794m.  
Research assistance: Rivka Shter.

instead of just to those with push-button receivers.

But in the longer term, these advantages may be eroded. AT and T has kept its long-distance tariffs high to subsidise local telephone services. Once separated from its local operations, it will have room to lower its long-distance rates close to the levels charged by its competitors.

AT and T also intends to carve out a share of another growth business, the market for transmitting and processing computer data. Data transmission is still only a fraction of the total U.S. communications market, but it is expected to mushroom over the next few years with the spread of such services as electronic mail and electronic banking.

The market is currently served by four companies, known as value added carriers, with a combined turnover of about \$600m last year. They are Teletel, a subsidiary of General Telephone and Electronics (GTE), the biggest of the independent U.S. telephone companies, Tymnet, part of the Tymshare computer service house; Graphnet, which belongs to Graphic Scanning, and Uninet, part of United Telecommunications.

AT and T plans to introduce this year its Advanced Communications Service (ACS), which has taken more than five years and many millions of dollars to develop. As well as transmitting data, ACS is designed to enable technically incompatible computers to converse with each other, a task once compared in complexity to

building a simultaneous interpretation system for the United Nations.

The service is expected to play a central role in AT and T's future strategy to penetrate the office automation market. It seems intended to weaken IBM's hold over computers, by enabling IBM products to be linked directly to other manufacturers' machines. It should also provide a vehicle for a wider marketing effort in the office.

AT and T's principal beachhead in the office at present is through the supply of private branch exchanges (PBXs). But though the U.S. market for new PBXs has been growing by 20 per cent annually to reach \$850m last year, AT and T's share has declined to around half from almost total domination a decade or so ago.

The steady erosion of its monopoly has attracted more than two dozen PBX competitors. They include telecommunications companies such as GTE and Rohm of the U.S. and Northern Telecom and Mitel of Canada. Computer companies Honeywell and Data-point are in the fray, too, and IBM is expected to start marketing in the U.S. a PBX which it currently supplies to customers in Europe.

AT and T is likely to start fighting back soon, when it is allowed to sell as well as lease PBXs. It is also expected to widen its product range to include sophisticated new office terminals which could be connected through PBXs to ACS and its long-distance telephone network. Dr Alan Pearce, a Washington telecommunica-

tion consultant, believes that AT and T's Western Electric manufacturing subsidiary will "make it a formidable competitor to IBM."

IBM has itself not been standing still. It has taken a major step towards competing directly with AT and T at the most advanced end of the communications market through its backing for Satellite Business Systems (SBS). It is also expected to expand its communications interests through acquisitions, following the recent termination of the Justice Department's anti-trust case against it.

SBS, a consortium owned by IBM, Communications Satellite Corporation and Aetna, started operating commercially last year. It is a highly sophisticated—and expensive—service, designed to handle the internal communications of large businesses with offices scattered throughout the U.S.

Using dish aerials on their office roofs, SBS customers can transmit and receive voice messages and large volumes of computer data via satellite. The system, due to be linked to British Telecom's network later this year, also allows businessmen thousands of miles apart to hold conferences on closed-circuit television. SBS plans later this year to launch a switched telephone service which will compete directly with AT and T's long-distance network.

The flexibility and versatility of satellite communications have attracted other big companies to the market as well. Fairchild Industries and Continental Telephone own American

Satellite Corporation, which is linked with Western Union's Western satellite system. Other companies involved in communications satellites include GTE and RCA, the diversified electronics group.

AT and T's new ambitions also extend beyond the U.S. coastline. Last year it set up an international division to offer consultancy services and to market Western Electric equipment overseas. It recently agreed to buy 45 per cent of Telegon, Ireland's biggest telecommunications manufacturer, and this week it will establish its corporate identity in Britain by being listed on the London Stock Exchange.

Its emergence on the international scene, from which it has been absent for most of the past 50 years, spells stiffer competition for ITT and for foreign companies such as Sweden's L. M. Ericsson, West Germany's Siemens, the Dutch Philips group and Nippon Electric and Fujitsu of Japan. A couple of years ago AT and T won a major order to supply public telecommunications equipment to South Korea and it also has a small share in Egypt's \$200m modernisation programme.

It is widely believed in Washington that the Justice Department's decision to end its anti-trust case was influenced by the Reagan Administration's desire to strengthen American industry against the growing Japanese challenge in electronic technology.

Western Electric will be much more aggressive than in the past," says Mr Brad Peery, an AT and T analyst with U.S.

Some industry experts also believe that AT and T may find the going tougher in new business communications services, such as ACS. Paine Webber's Mr Sandy Garrett points out that Xerox withdrew plans to launch a similar service, X-Ten, after concluding that it would take too long to recover the huge initial investment required.

But if AT and T shares any of these doubts, it certainly is not admitting to them publicly, and none of its prospective competitors can afford to dismiss lightly the challenge which it is likely to pose them in future. Says Dr Pearce: "Why should AT and T agree to dump its secure local monopolies to enter untested markets? The answer must be that it is absolutely certain that it can dominate new markets as it has dominated old ones."

## Men & Matters

### Outpost

Many a public platform is going to be the duller for the departure of the flamboyantly moustachioed Tom Jackson who retires in June after 15 years as general secretary of the Union of Communication Workers, the postmen's union.

But chatting to him after the election of his successor, Alan Tuffin, I could detect no regret in Jackson's going. "It will be wonderful to wake up and know that 200,000 people don't depend on you making the right decision," he says.

He has been keeping his familiar profile a little lower these past few years, declining many of the media and public engagements that made him perhaps the most instantly recognisable of our union leaders.

Jackson does not intend to become a "trade union odd-job man" like some of his colleagues on the TUC who just cannot give it all up.

He will remain a government representative on the BP board until his contract expires in 18

months "when I don't expect they'll want me any more." The Labour Party will continue to enjoy his allegiance—but that, he says firmly, will be it.

At the age of 56, Jackson intends to combine business with pleasure by opening an antiquarian bookshop in York. He has a long-held passion for old books, especially children's books. It is no coincidence that UCW conferences have usually been held in bibliophile resorts where Jackson could wander through the second-hand bookshops between debates.

And what of the future of the union to which Jackson has been devoted since he joined the Post Office as a messenger boy in 1959? "The greatest challenge will be new technology," he says. "The letter post will reduce dramatically, though you'll still need postmen to carry packets and our telephoned members will still be wanted. But sooner or later, we'll need to merge."

With Jackson gone, in the meantime, how shall we know who to blame if the post is late?

### Cover charge

Postal changes of quite a different stamp are being mooted in the Channel Islands where the smaller isles in the halfwick are making a determined bid for a share of Guernsey's firm a year philatelic profits.

When Guernsey took over postal services from an indulgent GPO in 1969, it banned independent and lucrative issues by such neighbours as the 500-acre island of Herm or the even-smaller isle of Lihou whose soldierly owner Patrick Wootton almost declared UDI.

By threatening to go it alone, Alderney has just forced Guernsey into a compromise agreement to issue Alderney "regional" definitive and commemorative stamps and hand over the profits.

Now Sark wants own stamps, too. The island's hereditary ruler Michael Beaumont is of

move a proposal to that effect in his feudal parliament, Chief Pleas, this week.

Should there be any delay in issuing Sark stamps, he says, Guernsey will face a claim for payment for using Sark scenes to illustrate its own stamps.

### Left bank

More senior executives, I suspect, will follow Patrick Moorsom in a drift from the London offices of the French banks as the ripples of Mitterrand's nationalisation spread across the Channel.

Moorsom is leaving the Banque de Paris et des Pays-Bas, where he has been a sous-directeur since 1974. He is to be replaced next month as managing director of its corporate finance arm, Cayer Ltd.

"Unsettling uncertainty about the future was an important element in the decision to move," Moorsom tells me. It compared unfavourably with the prospects at Cayer where former N.M.F. Rothschild vice-president David Secker Walker, who now runs CG, is beginning to build up its corporate finance activities.

Until now these have lagged well behind CG's interests in investment management, handling funds of £1bn, and the management buy-out services which featured most prominently in the recent deal for moneybrokers Exco International.

But with £10m available from last month's rights issue, Secker Walker tells me that more resources will be put into the financing of small to medium-sized businesses.

Moorsom's appointment is the first of several being made to reinforce the Cayer team in this field. His own background should make him feel at home inside the British and Commonwealth Shipping group of which Cayer is part. The son of a Welsh shipowner, Moorsom was a director of shipbrokers Calbraith

Wrightson and was later involved in ship financing for Amex Bank and Barclay's Merchant Bank as well as the Banque de Paris.

### Arms and the man

Financial journalism is becoming as dangerous as sports reporting.

Colleagues covering the ACC shareholders' meetings last week were held at bay by a security lady whose attractive blonde appearance belied her determination to prevent the Press from crossing the threshold.

While male reporters peered through a partition at the proceedings, however, a woman from one newspaper entered into an ill-advised scuffle with the guard, retiring with what, she thought, might be a broken arm.

Little wonder then that the newspapers seem to have been unable to tell their accents from the apostrophes in writing about the new Australian chairman Robert Holmes a Court.

A quick glance through the columns in the last few days has revealed at least six other versions of the elegant entrepreneur's surname—all wrong. He is not Holmes a Court, A Court, a 'Court, A Court or even A'Court.

As a second cousin to the sixth Baron Heytesbury, the ACC bidder traces his ancestry back to William Pierce Ashe a Court, an army colonel and MP who was created a baronet in 1795. His son, the first Baron, was ambassador to St Petersburg in the early 1800s and later Viceroy of Ireland.

### Mental note

Written on a poster in a Birmingham psychiatrist's waiting-room: "Please adjust your stress before leaving."

Observer



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# FINANCIAL TIMES SURVEY

Monday January 18, 1982

# COMPUTERS

The battle for new computer-related markets is being waged at national as well as company level. Most industrialised nations now view computer and electronic technology as a priority and provide support schemes.

## New product areas erode frontiers

BY GUY DE JONQUIERES

IF COMPUTERS are the "steam power" of the new industrial revolution, then the 1980s must surely be the decade of the express-train. It is hardly stretching the analogy to add that it also promises to be the era of the motor car, the jet aircraft—and, perhaps, even of the space shuttle.

For computing has now reached a point in terms of its availability, cost and versatility, at which its social and economic consequences can be compared to that of mechanised transport. Both have altered human perceptions of the world by radically transforming previous concepts of time and space.

The computer today can perform, in seconds, those operations which would have once required thousands of man hours to carry out, or which it would have been physically impossible to do at all. It can compress into a space, occupying only a modest room, volumes of information which would fill several libraries if committed to paper. And it can retrieve, order, and cross-

reference them at speeds that would defeat a regiment of librarians.

Just as the oil, coal and steel industries grew up around the railways during the 19th century, so many of today's industries have come to depend on computers for their lifeblood. Without computing power the world's banking systems would grind to a halt, markets would cease trading, commercial aircraft would be grounded and much manufacturing plant would no longer be able to function.

Government and public services would be paralysed, hospitals would be deprived of many diagnostic and treatment facilities, and traffic light systems would cease to operate. Most types of modern military equipment would also be immobilised.

There are, however, two significant differences between the history of mechanical transport and of computing. One is that while transport has developed steadily over the past 150 years, most of the notable achieve-

ments in computing and their practical application have taken place during the past 40 years.

Second, while mechanised transport has increased human mobility, computing—by vastly expanding man's access to information—has also enlarged the range of activities which he can perform without needing to move from one spot. For example, the engineer can use his computer to calculate critical specifications by simulating conditions whose effects could otherwise be determined only by a lengthy process of trial and error in the field.

### Choice narrowed

But in other respects the stages of development of mechanised transport and computing are remarkably similar. The state of data-processing in the 1950s and 1960s can be compared closely to railway travel.

Just as rail passengers are restricted by the geographical layout of the rail network and by the timetable of the trains

running on it, so the limited processing power and cumbersome operating procedures of most computers at that time narrowed the choice of the users.

Most data then could only be batch-processed: information was transported physically to the computer, processed, and the results shipped back again to where they were needed. Each user's requirements had to be fitted into a rigid timetable tailored to try to meet everyone else's needs. There was no boarding or alighting from the data-processing train between stations.

Then came distributed data-processing and the spread of the microcomputer. The advantages of this development may be compared to those of the bus, able to adjust both its timetable and its route map to suit varying conditions, but still bound to meet the needs of all its passengers at once and under the control of a single driver.

The arrival of the personal computer ushers in the same personal freedom as did the

mass-produced motor car. It offers the individual greatly-expanded choice and control, bringing to his desktop processing power and data storage capacity which a few years ago would have been available only on a large central computer. Moreover, it is available for use on demand.

The era of the jet aircraft is just starting to dawn. It is the result of the merger of computer and communications technology into a single entity, whose essential characteristic is the digital signal or "bit," expressed either as a zero or as a one.

The digitisation of telecommunications enable networks to be turned into vast, high-speed data "highways" along which vast quantities of information can travel from one computerised device to another. And because any type of information can be expressed in digital form, modern networks can carry not just computer data but voice communications, text, images and television transmissions.

This technological conver-

gence is the underpinning of the emergence of a new "information society," whose electronic arteries will link homes, offices and factories in a huge computerised network. By communicating information instantaneously to the point where it is needed, the network will remove the need for many types of travel—in the shops, to the bank, to the library, perhaps even to the office. The longer-term consequences for society as a whole can still only be guessed at.

### Strategy change

How quickly the "information society" will be attained, and the precise form it will take, are also uncertain. Predicting the speed at which technological advances will be translated into products and systems is notoriously difficult. But the increasing pervasiveness of computer power is already being reflected in changes in the structure of the computer industry.

One result has been that the industry's ranks, dominated only a decade or so ago by relatively few small companies, have been swollen by the arrival of smaller newcomers which have successfully combined innovative ideas with technological expertise and entrepreneurial initiative to carve out market shares.

In many cases new growth markets have been pioneered by the entrepreneurs rather than established companies. Thus, Apple and Commodore led the way in personal computers, Wang in display word processors and Digital Equipment in minicomputers.

At the same time, the older-established companies have had to expand into new product areas and adapt their development and marketing strategies in order to remain competitive. Thus, the past year has seen IBM enter the personal computer market and ICL diversify from its base in mainframe computers into office equipment,



### CONTENTS

- Japan: new challenges .....II
- Japan: export strategies .....II
- Japan: technical innovations III
- U.S.: responsive action .....IV
- Big computers: future demand likely to be strong.....IV
- IBM: colossus in transition...V
- Plug-compatibles: now a \$43bn market .....VI
- IBM's competitors: tough times ahead for some .....VI
- Minicomputers: changes in the market .....VII
- Case studies: a look at various manufacturers .....VII, VIII
- Micros: surprising the giants .....VIII
- ICL: fighting back .....IX
- France: more reorganisation underway .....IX
- Germany: weakening demand .....XII
- Italy: Olivetti and IBM .....XIII
- Nordic countries: new challenge .....XIII
- Data handling: busy market XIV
- Data communication: strong growth area .....XV
- Data storage: new systems XVI
- Banking: moves towards a cashless society .....XVII
- Artificial intelligence: robots that listen and talk .....XVII
- Medical applications: patient progress .....XVIII
- Defence: spearheading projects .....XVIII
- Industry: vast applications XIX
- Education: changing attitudes .....XX
- Computer-aided design: wide scope for expansion .....XX

● Editorial production of this survey was by Mike Wiltshire and Arthur Dawson. Design by Philip Hunt.

CONTINUED ON PAGE III

# LAST YEAR WE THOUGHT IT WAS TIME WE HAD OUR OWN MAINFRAMES.

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COMPUTERS II

John Fujii charts the winners among Japanese companies

Japan steps up the race against IBM

IN LESS than 30 years since Japan's first domestically developed computer was introduced on the market in 1954, Japan has come to the forefront of the world's computer industry.

The first big development in the process was in 1971 when the Ministry of International Trade and Industry provided approximately \$300m in Government funds between 1972 and 1976 to meet the challenge of the IBM 370 Series.

At that time, Fujitsu, Hitachi and Mitsubishi Electric were instructed to pursue the development of an IBM compatible system while Toshiba Corporation and Nippon Electric Company were told to develop non-compatible architecture.

Later, Mitsubishi and Oki Electric Industry dropped out of this programme to go into small and medium computers.

Today, Fujitsu and Hitachi have the world's most powerful large-frame computers, the M-Series, to compete with IBM's latest 3081 which offers 14 MIPS (millions instructions per second).

Hitachi's HITAC M-280H has 17 MIPS while Fujitsu's FACOM M-380 has 15 MIPS and the M-382 offers 30 MIPS. The ACOS-1000 developed by Nippon Electric has 29 MIPS.

In these few short years, Japanese large-scale computer manufacturers have held down IBM Japan's growth in the world's second largest market while cutting into IBM penetration in the developing countries.

There are six big general purpose computer manufacturers in Japan. Fujitsu, Hitachi, Nippon Electric (NEC), Toshiba, Mitsubishi and Oki which dropped out of the large-frame business by virtue of their tie-up with Nippon Univac Kaisha.

The big American computer companies in Japan are IBM

Japan, Nippon Univac Kaisha, Burroughs, NCR (Japan) and several European companies such as Nixdorf of West Germany and Olivetti of Italy although they are primarily in the smaller machines.

Fujitsu, Japan's top computer manufacturer, bettered IBM Japan during 1980 for the second year in a row in electronic data processing (EDP) revenues. Fujitsu reported revenues for the fiscal year ending March 31 1981 of ¥81.6bn or \$2.77bn of which \$1.8bn came from its information processing division. This was up 17 per cent over the previous year.

At the same time, IBM registered calendar 1980 revenues of \$1.6bn, 4.3 per cent over 1979. However, in net income, IBM Japan came out

FUJITSU

The top computer manufacturer bettered IBM Japan last year for the second successive year in EDP

on top with \$174m or 10.7 per cent of sales compared with Fujitsu's \$86m or 3.2 per cent of total sales.

Fujitsu exports totalled \$389m or 14 per cent of sales, up 2.8 per cent over the previous year. IBM Japan reported 1980 exports of about \$327m, a 20 per cent increase.

Hitachi reported sales of ¥260.7bn or \$1.185bn in computers and peripherals, up 16 per cent in fiscal 1980. Electronic processing equipment and electronic devices accounted for 25 per cent of the \$9.8bn in total sales. Hitachi's global exports totalled \$2.5bn.

Nippon Electric reported sales in the information processing division, mostly computers and peripherals, of ¥240.28bn or \$1.145bn, up 20 per cent out of total revenues of ¥1,074.9bn or \$4.7bn.

Of NEC's global exports, computers and peripherals accounted for 5 per cent, communications equipment and devices 40 per cent, electric devices 20 per cent and home electronic products 27 per cent.

NEC said that a third of its \$2.961bn sales in Japan came from Government and official institutions. Exports were up 30 per cent to \$1.291bn.

Fujitsu and Hitachi have approximately 60 per cent of the Government agency business.

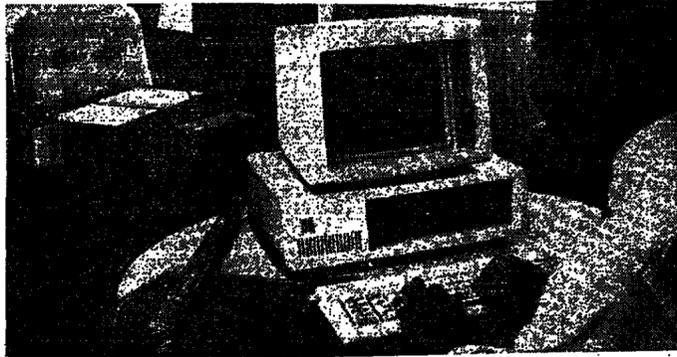
Fujitsu cites its wide range of computer usage by such institutions as the Federation of Bankers Association of Japan, the Ministry of Labour, Dai-ichi Kangyo Bank, Kawasaki Steel and the National Space Development Agency of Japan.

Despite the inroads made by the Japanese computer companies, IBM Japan still holds on to a 28 per cent share of the Japanese market, mainly in large-scale systems.

In large-scale computers (over ¥500m in value), IBM Japan was first with 40 per cent of the market, according to the figures provided by Computopia as of June 1981.

Others in large-scale market share were Hitachi 17.3 per cent, Fujitsu 16.1 per cent, Univac 11.7 per cent, NEC 10.5 per cent, Burroughs 2.2 per cent, NCR 0.4 per cent, Mitsubishi 0.3 per cent and others 1.6 per cent.

The purpose of the Mitsubishi programme, as reported, was to provide a wide range of computers so the Mitsubishi group companies could "buy Mitsubishi." It was reported



MARKET SHARE IN JAPAN

	Percentage values			
	1978	1979	1980	1981
IBM Japan	28.0	27.8	28.7	27.6
Fujitsu	20.5	20.5	19.6	21.1
Hitachi	15.8	15.8	15.4	16.6
NEC-Toshiba (joint sales firm)	14.3	14.6	14.3	14.1
Oki-Univac	12.7	11.7	10.8	10.4
Burroughs	2.8	4.3	4.1	4.1
NCR	2.6	2.4	2.2	2.0
Mitsubishi	1.5	2.2	3.2	3.0
Others	6.8	6.8	1.5	1.1

Source: Computopia.

Japanese component manufacturers are supplying parts for IBM's personal computer, shown left. The computer, which is assembled in Florida, can generate and display charts, graphs, text and numerical information.

that the Mitsubishi affiliated companies promised to turn in their IBMs for Mitsubishi's if they were as good. Mr Kato said that in this day of business, companies buy the best equipment regardless of group affiliation.

The Japanese are not satisfied with just keeping up with IBM. They are now looking ahead in the computer business with a "fifth generation" computer,



Despite inroads by domestic companies, it still holds a 28 per cent share of Japanese market

just as they have developed a 256K RAM (random access memory) chip already.

The Japanese Government and the private sector, including the six domestic computer manufacturers, the Electronic Technology Comprehensive Research Center (ETCRC) and university research institutes will join in pooling their know-how for development programmes leading toward a "fifth generation" computer.

The Ministry of International Trade and Industry (MITI) intends to invest approximately ¥100bn (\$454m) into the project over the next 10 years with the goal of having the computer available by fiscal 1990.

The schedule calls for research to begin in 1982, hard-

ware to be designed by fiscal 1985, software in 1987 and work beginning thereafter on an experimental model so that a prototype will hopefully be ready in fiscal 1990.

There have been inquiries from some of the European countries such as the United Kingdom, France and West Germany. Some U.S. Government agencies have also shown interest.

The new "fifth generation" computer will have all new hardware and software architecture and a new way of communicating with human beings. The Japanese future machine will be able to hear and talk and have knowledge to solve problems.

The machine probably will have "Josephson's Junction" circuits that operate in absolute zero temperatures and would be much more rapid than the fastest semiconductors now available, according to the experts.

Finally, Japan's computer usage is expected to grow at a 15.2 per cent rate annually over the next five years.

The Council for Promotion of Information Processing reports that computer utilisation throughout Japan should double to ¥8,000bn or \$7.2bn in the next five years in terms of installation costs.

This group, which advises the Ministry of International Trade and Industry, said there were an estimated ¥4,091.3bn or \$18.59bn worth of computers in use in fiscal 1980. Installation costs were calculated in terms of computers for general use and all leased computers were included.

Strategies may differ among Japanese groups but the target remains the same

Search widens for export markets

JAPAN'S COMPUTER industry does not seem to have a unified strategy for exports. Instead each company professes to have its own policy dictated by its needs. It is certain that all the companies are emphasising exports to the developing or neighbouring countries first.

Fujitsu and Hitachi, two of Japan's largest, are concentrating on OEM (original equipment manufacture) or private label trade while Nippon Electric (NEC) believes in building up its company image overseas by exporting peripherals and small business machines first, and moving eventually to the larger models.

Mr Akiyoshi Kato, the vice-president and general manager EDP (electronic data processing) overseas operations of Fujitsu, said that the OEM system is self-defeating in that it does not build up the company image over the long run.

At Fujitsu, Mr Naruto Michio, general manager for international operations, seems to think his company policy is the best. He cited growth in exports this year of 20-25 per cent to ¥58bn (\$263.6m).

Mr Mitsubishi Saitoh, manager for Hitachi's computer planning department, also believes OEM is the way to go for overseas growth. Mr Naruto projected exports of around 30 per cent for Fujitsu's eventual target. This is in view of the fact that the fastest growing sectors are the developing countries such as Australia, South Korea, Taiwan, the Philippines, Brazil and Spain.

Fujitsu has invested ¥8.8bn or \$40m over the past 10 years in building up their markets in these areas.

Fujitsu expects to have a 40 per cent annual growth to reach that ¥58bn target. Hitachi hopes to increase exports by 60 per cent to ¥28.5bn or \$120m while NEC plans for a 50 per cent direct growth to ¥10.8bn or \$90m.

Fujitsu sold \$70m worth to the U.S. mainly through Amdahl in which they have a 32 per cent interest. Fujitsu also exported \$30m worth of products to Europe, primarily to Siemens. The new deal with ICL is expected to spur future exports to Europe.

The remaining \$70m worth were shipped to 10 other countries including Spain, Brazil, Taiwan, Singapore and South Korea.

In addition to the Amdahl agreement, Fujitsu has formed TRW-Fujitsu Co. in a joint venture with TRW Inc. in the U.S. The new company handles sales of small and medium scale computer systems as well as terminals for retail and banking applications.

In the latest agreement with ICL of the UK, Fujitsu will supply mainframes as well as provide early access to Fujitsu's advanced LSI chip and computer aided design technology.

Fujitsu also has a licensing agreement with Sociedad Espanola de Comunicaciones e Informatica SA (SECOINSA) under which the Spanish company manufactures and markets its own small-scale computers, peripherals and terminals.

NEC has sold 10 medium sized computers to China. They are restricted from selling large computers by COCOM (Co-ordination Committee for Export to Communist Areas).

By far the biggest potential for NEC is in the neighbouring countries of South Korea and Taiwan. A joint venture has been formed in Taiwan, Central Computer Center Corp. Six medium-sized computers have been ordered.

In South Korea, 20 medium-sized computers have been sold through NEC's arrangements with the Samsung group.

In Hong Kong, Argentina and Brazil, NEC has been selling their computers with success. In Brazil especially, peripherals and printers have to be local products. Assembly on a knockdown basis is in progress.

NEC has an arrangement with NEC Telecommunications Europe in London to handle sales all through Europe. Peripherals and other equipment will be incorporated into their systems.

Nippon Electric has a special

interest in the Middle East where they have set up an ACOS support centre in Baghdad where 20 technicians are stationed to help service their oil country clients. Fortunately, IBM is not in countries like Iraq, Egypt and Saudi Arabia.

NEC has a four-stage programme. First, sales to developed countries, second to Asian countries, third to the Middle East and finally to the Communist countries like China and the Soviet Union. The good thing about the oil countries is that they have money and all of their imports are outright purchases. However, there is some country risk.

Five Hitachi oem computers made. Hitachi only exports CPUs (central processing units), disk drives and tapes to its oem partners while the partners take care of software and maintenance. Hitachi now sells 10 per cent of its EDP products in foreign markets in five years' time, exports are expected to reach 20 per cent. Small computers also account for 45 per cent of exports.

Toshiba also exports small business computers and peripherals. Half of its 1981 export sales of \$34m will be in work stations, disc drives and other peripherals. Projected sales for VSBC in fiscal 1981 are 3,000 units.

Fujitsu has also sold 16 medium computers to China. China is a potential market but is restricted under COCOM regulations.

Hitachi's proposed sale of a M-180 through the China Trade Council has been held up by the U.S. under COCOM regulations. It has been ordered for use in a Beijing university research laboratory.

Mr Naruto declared reports that Japan was out to get IBM. "IBM is our teacher. Without her we cannot survive." Obviously, he had reference to the fact that Fujitsu manufactures plug-compatible equipment. He noted that IBM has 60 per cent of the world market compared to just 3 or 4 per cent for Japanese companies combined.

Mr Naruto also insisted that Japanese software is not weak. He said that the Japanese are good at figures and as a result excel in application software.

The Japanese merely have a different approach to software. "We are not lacking in software," he insisted.

The Japanese have set up a Software Industry Promotion Society with 127 regular and 30 associate members to promote the development of software.

NEC exports about 10 per cent of its data processing equipment amounting to about ¥22 to 23bn in the fiscal year ending in March, 1982. The figures are on a FOB basis. These figures include SBCs but not personal computers.

NEC aims for 50 per cent growth in exports so that in five years' time they expect to reach the ¥100bn figure. Although they are not yet selling their ACOS series overseas, NEC is doing very well in small business computers.

They have set up NEC Information Systems Australia to handle sales in that country. In Singapore, three years ago, they set up NEC Computers Singapore Pte to handle sales to Thailand, Malaysia, Singapore and Indonesia. In Mexico, NEC Information Systems based in Lexington, Mass., handles two dealers already through their Dallas office. Although they have sold 50 SBCs, Mr Naruto admitted that Mexico is IBM territory and difficult to penetrate.

Hitachi concentrates on OEM sales of large mainframes through National Advanced Systems in the U.S., Olivetti in Italy and BASF in West Germany—which amount to 70 per cent of total EDP exports. NAS took three out of every

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COMPUTERS III

Alan Cane examines areas where Japan is out to dispel the myth that it is a nation of refiners, rather than creators

Testing time for Japanese innovations

THE JAPANESE are out to prove that in information technology they are as good as originally as they are at machinery.

They already build some of the best large commercial computers. Siemens, ICL, Olivetti, BASF are among the major European companies which have commercial agreements with Japanese mainframe manufacturers. Nasco, the mainframe computer arm of National Semiconductor, one of the major semiconductor manufacturers in the U.S., markets Hitachi mainframes in Europe and the U.S.

Their reputation is growing rapidly in the small computer field. National Panasonic, Sord, Nippon Electric and Matsushita all make well regarded microcomputers.

Companies such as National Panasonic have eased their machines into the European small systems market by agreements with suppliers able to provide proprietary software to run on the machines. National Panasonic, for example, first sold in the UK its machines equipped to run MicroCobol, a microcomputer version of the world's most used business language.

It is well recognised that the Japanese have been much slower to develop fine, reliable software than first rate hardware, but this is changing. Only a few weeks ago Mr. David Fairbairn, director of the UK National Computing Centre warned that Western complacency over its software lead was misplaced.

The spur behind much of Japan's industrial effort, its Ministry of International Trade and Industry (MITI) is reported to have agreed to provide Japanese computer manufacturers with \$150m over the next three years to create new operating systems software.

These are the instructions which run the computer itself, as opposed to the applications software which carries out specific tasks such as accountancy or payroll.

Efficiency test

The efficiency of the operating software to a very large extent determines the efficiency of the computer itself. Of Japan's three principal mainframe computer manufacturers, Fujitsu, Hitachi and Nippon Electric, Fujitsu and Hitachi are electric, Fujitsu and Hitachi now make machines which are IBM plug compatible.

They are IBM look-alikes and will run IBM operating software. With the aid of the MITI investment, Japanese companies aim to produce operating software that is significantly better than IBM's for computers that perform significantly better than IBMs.

Fujitsu built the first Japanese computer back in 1954. Now there are some six Japanese companies. Fujitsu, Hitachi, NEC, Oki, Toshiba and Mitsubishi together with IBM (Japan) and Univac (Japan) selling significantly in the Japanese business computer market. Fujitsu has the largest number of installed computers in Japan and according to Mr Y. Kawatani, its general manager,

sales administration, it also produces the world's largest and fastest general-purpose mainframe, the FACOM M-382.

General purpose rules out the enormously fast special machines such as the products of Gray Laboratories, built specifically to solve scientific and modelling problems.

The M-382 is claimed to provide 2.7 times the performance of the IBM 3081, widely regarded as the first of IBM's new generation of big computers. It is said to have four times the memory capacity (essential for speedy working) and three times the speed.

How has this been accomplished? The M-382 is not conceptually a new kind of computer, but it has taken conventional technology to the limits imposed by present fabrication techniques.

Fujitsu has not done this alone. The initial force behind the IBM plug compatible market was Amdahl Corporation, set up by Gene Amdahl, formerly a senior designer with IBM. Amdahl believed he could improve the performance of IBM-type machines using new technology and needed money to prove it.

Fujitsu provided that money in exchange for a stake in the company and a share in Amdahl's technological know-how.

Now Fujitsu and Amdahl collaborate in the generation of new technologies, while developing their computers quite separately.

The old story of the Japanese as refiners rather than creators hangs on, however. Mr Terry Pasola, managing director of Amdahl (UK), points out: "We do not think of them as innovators, rather as the most effective electronics manufacturer there is."

Their joint efforts have produced higher speeds and higher density logic and memory chips. Mr Kawatani points out: "The M-382 is air-cooled rather than water-cooled; it uses 64K RAMS rather than 16K and smitler-coupled logic devices with 1300 gates per chip compared with transistor-transistor logic devices with 704 gates per chip."

It was, in fact, Gene Amdahl who believed that air could be used to cool dense logic and memory chips when most of the computer business believed that computers would burn up if they were not water-cooled.

It was also Gene Amdahl who was one of the first to use large-scale integrated circuits and then very large-scale integrated circuits in his computers.

Mr Pasola points to three areas where he believes Amdahl can stay ahead of Fujitsu despite the fact that both companies are starting with the same building blocks.

"First, there is microcode, computer instructions written into memory chips. With Fujitsu we developed a seven nanosecond switching time random access memory chip."

"In the 580, we have been able to put microcode on each of the central processor unit controller boards using those chips."

"Then we have developed a bus which enables individual chips

to talk to each other with a memory bus controller acting as the system policeman.

"And finally, we have developed macrocode, to sit on top of the operating system and which can give the impression that the 580 is a series of different computers all operating simultaneously under different operating systems."

An advantage

But Japan's great strength is in semiconductor manufacture. While most of the U.S. manufacturers are having problems with the production of 64K random access memories, Japanese systems houses are using home grown devices in their products.

And Japan can point to a growing string of innovation in semiconductors—the high electron mobility transistor (HEMT) for example, pioneered and developed at Fujitsu, and the static induction transistor, invented by Jun-ichi Nishizawa of Tohoku University in 1950.

And according to Mr Kawatani: "All six of Japan's computer makers are involved in communications."

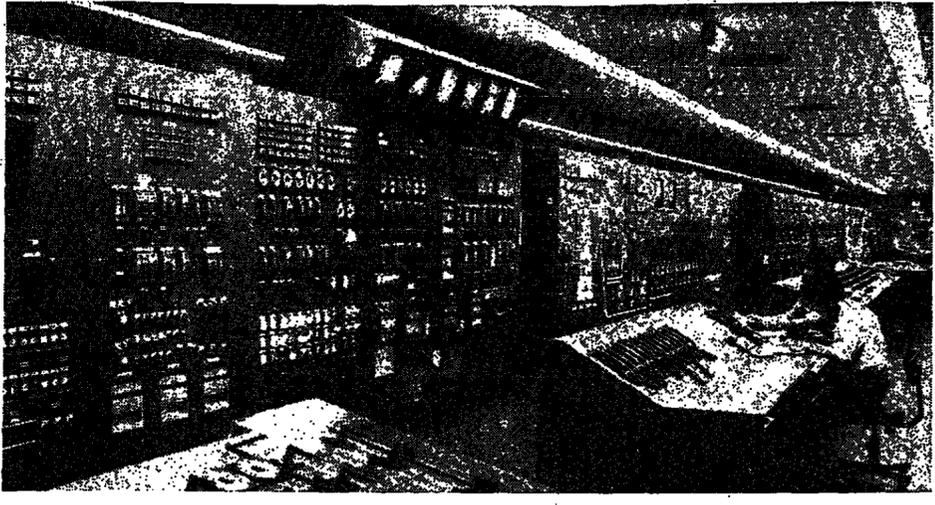
"Fujitsu, for example, started out in 1935 making telephone instruments and was until quite recently primarily a communications company.

"In the age of distributed data processing, and complex computer networks, this is a decided advantage which most of the foreign competitors, including IBM, Univac and Control Data do not enjoy."

So, access to U.S. know-how (Nasco works closely with Hitachi), brilliantly refined manufacturing technology and communications skills; all this explains Japan's present position in the computer market. It fits well with the theory that the Japanese fight shy of leapfrogging current technology for fear of commercial failure.

But now MITI is putting some \$400m over 10 years into a project to create the next generation of computers, machines that process more than one stream of data simultaneously, that can store, assimilate and reshuffle data in an intelligent manner and which could come closer to the idea of an "electronic brain" than anything yet seen.

It would give Japan undisputed world leadership in information technology if it proves successful. It is an indication of the confidence of the Japanese computer industry that it has said publicly it is going for such a goal. And it could be the test which will finally prove if the Japanese are innovators or copyists.



An example of how Japan uses computer power to maximise industrial efficiency at a steel-making plant: computers at the Ohgishima works of NKK (Nippon Kokan) calculate energy use and recovery and are connected to the NKK Tokyo head office so that rapid instructions can be relayed from

22 miles away. Only 750 people are required on any shift at Ohgishima, and many of the workers are in control rooms filled with flickering computer screens, rather than the sound of metal and machinery. One man in a tower, for instance, operates computers controlling a hot strip mill that produces the world's widest steel coils.

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New product areas erode frontiers

CONTINUED FROM PAGE 1

small business systems and telecommunications. Very often traditional demarcation lines between different markets have been eroded. In the U.S. IBM, through its interest in Satellite Business Systems, is challenging the traditional territory of American Telephone and Telegraph, which in turn is poised to enter the office automation field. Both will compete there against Xerox, which withdrew from mainframe computers a decade ago but has re-emerged as a supplier of advanced integrated office systems.

The battle for these new markets is being waged not only at the level of companies, but nationally as well. Most industrialised countries now view computer and electronic technology as a priority resource and encourage its development through support schemes ranging from subsidies through preferential Government procurement to protectionism.

No national strategy has attracted keener attention, both for the boldness of its objectives and its success in fulfilling them, than that of Japan. In less than a decade, a carefully-co-ordinated programme of collaboration between Government

and industry has enabled Japan to catch up with the world leaders in computer technology and, in some respects, to overtake them. Japan's self-confidence can be measured by the ambitious scope of its widely-publicised project to develop a "fifth generation" of computers, well in advance of any currently contemplated in the U.S. Using highly advanced technology, new architecture and immensely sophisticated software, the machines would emulate aspects of human behaviour and would be endowed with the power to interpret and reproduce speech and, within limits, to reason.

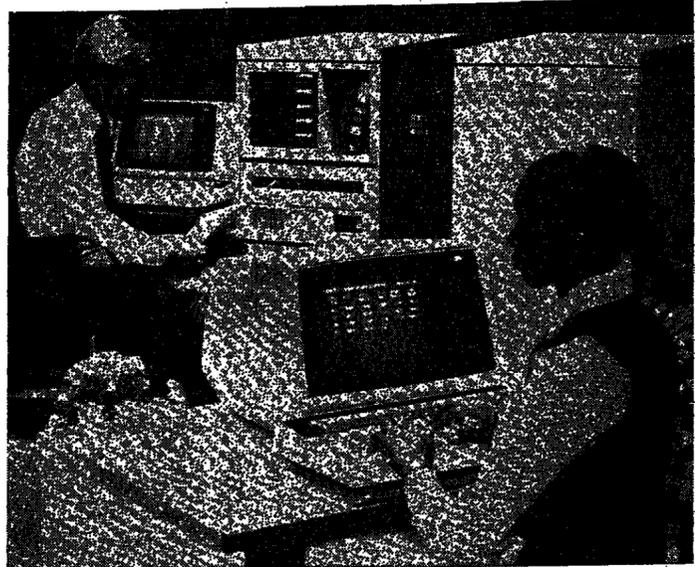
One of the leaders of the fifth generation research team has compared the project to the space shuttle, in terms of the advances which could result for human knowledge.

The analogy is, perhaps unintentionally, apt. For it underlines both the huge potential offered by computer technology, and the risks involved in exploiting it. As the near-collapse of ICL demonstrated earlier this year, the penalties for those who misjudge the market can be heavy. The computer industry may be full of promise, but it is also unforgiving.

COMPUTERS IV

Louise Kehoe in California charts U.S. reaction to Japan's assault on world markets

Two giants in battle for supremacy



Japanese companies are using joint ventures to gain access to the U.S. market. Above is a small general purpose information system sold in the U.S. by TRW-Fujitsu, a U.S./Japanese link-up

can expect to see severe price competition in their market in the coming months.

When Japanese personal computers are set alongside those built in the U.S., they will, however, be some remarkable similarities. Already many parts of the systems are actually supplied by Japanese manufacturers, and their merely re-labelled by the U.S. systems builder.

In computer peripherals, "made in Japan" is beginning to appear on an ever-increasing percentage of printers, video terminals and other add-on equipment. At the low end of the market, in personal computers, Japanese companies supply the peripherals for most U.S. systems companies. Even IBM, once the leader in printer technology, now buys printers from Japan.

The big computer makers are yet to receive their challenge from the Japanese—however they can be sure that it is not far off. Already IBM has been ousted as the top supplier of computers in the Japanese market. Japanese mainframe computer makers are building up their strength for an all-out assault on the U.S. and European markets, industry analysts believe.

Some Japanese built mainframe computers are already for sale in the U.S., but they do not carry the names of the Japanese manufacturer. National Advanced Systems, a plug-compatible manufacturer, sells Hitachi-built computers as well as its own.

Incidentally, NAS is a subsidiary of National Semiconductor, whose president is so outspoken on the subject of Japanese competition. While one part of National may be at war, another, it would seem, is fraternising with the enemy.

NAS's involvement with a Japanese supplier is by no means unique. TRW Inc. has gone even further by forming a joint venture company with Fujitsu to market the Japanese company's computers in the U.S. So far the company is selling small business systems and desktop computers. Later it may be expected to add Fujitsu's mainframe computers to its product line.

Japanese involvement in the mainframe computer market is widely expected to follow the pattern of the TRW-Fujitsu arrangement, with the native company supplying the marketing and support services that are essential for large computer systems, and the Japanese company being responsible for manufacturing.

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"WE ARE at war with Japan—not the kind of war with guns and bombs—but an economic war, and we've got a big uphill battle to fight." That is how Charles E. Sporcik, president of National Semiconductor, characterises the competition between the U.S. and Japan in electronics.

The stated intention of the Japanese to become a major force in computers is but one aspect of their desire to dominate electronics in every field; from consumer items, through computers and telecommunications. The mainframe computer market is the current goal, but along the way, the Japanese have targeted first the consumer electronics market, and now the semiconductor chip market.

The Japanese have already won the lion's share of the world-wide market in consumer electronics. In television, stereo, calculators, electronic toys, and digital watches—Japanese manufacturers lead the market. In the latest round of this fight, most of the U.S. and European manufacturers of calculators and digital watches have been driven out of the market by low Japanese prices which they could not meet while maintaining profitability.

The Japanese tactics are straightforward. They target a particular market segment, use their excellent manufacturing skills to produce a good quality product, and then cut prices to buy market share. U.S. and European manufacturers (of cars, cameras and televisions) have called this approach "unfair." They talk about "predatory pricing" and "dumping," and some call for government intervention to prevent excessive Japanese imports—but these are reactions that occur after the home industry has already lost a major share of its market. In semiconductors and computers, most U.S. industry representatives believe in a free market—but they look to Japan to open its doors to U.S. and European products before they will withdraw the threat of protectionist measures in the U.S.

The war in the semiconductor arena is still raging. U.S. electronics companies have been horrified over the past year, by the Japanese takeover of the key market for memory devices. Japanese manufacturers now supply 70 per cent of all 64K RAMs. These are the chips used to build computer memory

stores.

For the U.S. semiconductor industry this is little short of disaster. Although U.S. suppliers may recover some of the market in 1982, they can never expect to win a dominant position. Without experience in building 64K RAMs, they may not be able to maintain their technology lead in other types of devices such as microprocessors. And almost certainly, Japan will also dominate the next generation of memory devices—256K RAMs.

Already, three Japanese companies have announced that they have sample quantities of 256K RAMs. While some U.S. companies are believed to be working on the 256, the very real fear now is that the Japanese have moved ahead in semiconductor technology.

But U.S. chip makers are fighting back. Individual companies have begun highly successful quality improvement programs, and productivity programs designed to make them more competitive. Many companies have become involved in joint development programmes which spread the enormous product development

costs of a new family of devices between two or more parties.

The most significant such agreement is that between Advanced Micro Devices and Intel, which covers a wide range of products. Another recent development has been the creation of an industry supported research co-operative to fund long term research at US universities.

While U.S. computer makers are uneasy about Japan's threat to the U.S. semiconductor industry, it has not stopped them from taking advantage of the low prices being offered by Japanese suppliers. Even the semiconductor companies themselves will buy Japanese parts to make systems products if the price is right.

Reflecting the concern of many U.S. computer makers, Hewlett Packard has published some details of its buying patterns in memory chips. The computer and instrument manufacturer reported last week that no U.S. supplier has yet met its specification requirements for 64K RAMs, although it expects one U.S. company to do so soon. Until then, Hewlett Packard, like every other U.S. computer

maker, will continue to buy huge quantities of Japanese memory chips.

For the U.S. computer industry, the failure of the U.S. semiconductor manufacturers to supply the needed 64K RAMs means that they must rely upon their potential competitors for these parts since Japanese semiconductor makers also build computers. For example, a U.S. computer maker buying memory chips from Hitachi is also dealing with the manufacturer of large IBM type computer systems. In the back of the minds of U.S. computer makers must be the question of what would happen if the Japanese company chose to cut off (or down) supply of a key part.

The Japanese challenge in computers has started at the bottom of the market with low-cost personal computers. Although few Japanese made systems have so far reached the U.S. or Europe, they are expected to become a major force in this market over the next three years. "The Japanese are coming" is an immediate threat to companies such as Tandy and Apple which

Big computers are still thriving, as Alan Cane outlines below  
Vector processors bring fresh dimensions of power

SOME HAVE labelled the big computer the dinosaur of data processing, yet the market for big mainframes is increasing. It is not showing the rapid growth seen in other sectors of the computer business, but because, until fairly recently, mainframes were the only computers available, that is hardly surprising.

The reasons are embedded in the way computing underlies virtually every aspect of business life and in the fact that once customers have tasted computer power, they always come back for more.

Those companies at present using minicomputers will want eventually to trade up to mainframes; those already using mainframes want faster and more cost-effective machines. Against that background, it is easy to see why all the major manufacturers continue to put substantial resources into their big machine research effort; why ICL, in particular, puts so much emphasis on big machine technology at the expense of minis and micros.

These days, of course, defining a big computer is difficult when a respectable mini can outperform a sizeable mainframe of only a few years ago.

Monuments

At the very top of the tree, the supercomputers are in a class of their own. These vector processors—so called because of their ability to operate on very large arrays of data—are monuments to raw computing power.

The fastest number-cruncher in the world, the Control Data Corporation Cyber 205, runs at up to 800m floating point operations a second (floating point operations are simply a measure of pure computing speed; millions of instructions per second (MIPS) are also quoted but these figures invariably include some housekeeping instructions—that is, not of direct use to the user).

Before the Cyber 205 was built, the fastest commercially available machine was the Cray I, built by Seymour Cray, formerly chief designer for Control Data. It is now building the Cray II which should set new benchmarks for super-

computing.

These are dedicated, pernickety beasts which need to be fed the right kind of problems—ones involving very big numbers—to operate at their best. Given a typical commercial mix of jobs, some batch work, some time sharing, a lot of file handling, they could be beaten hands down by a conventional large mainframe. But given long strings of numbers to chomp, vectors of more than 20 characters in length, they get faster and faster as the calculation goes on.

Supercomputers like the Cray or the Cyber, conventional business machines like the IBM 370/168, even pocket calculators, all compute in exactly the same way.

Computational methods have not changed much since the early days of computers. What has improved the speed of computation is the development of processors and memories on silicon chips together with a number of bright ideas to speed the progress of data through the machine.

Mr David Barkal, a big machine specialist at Control Data, points out that the chips used in the Cyber 205 go through one clock cycle in 20 billionths of a second (a clock cycle is another measure of machine speed—by comparison a good minicomputer might have a clock cycle of 600 billionths of a second).

Instructions and data are pipelined in the 205 which means that before one operation is completed, another has already started, so that a whole string of computations are "in the pipeline."

Such a rate of computation requires data and instructions to be brought to the processing units at high speed. In the 205 this is achieved by the direct movement of data from memory to processor without intermediate stages on the way. The 205 can carry out both vector and conventional (scalar) processing. It is dedicated entirely to number-crunching and requires a second, smaller computer to look after its house-keeping. One of the five 205s already installed is at the Meteorological Centre, Brack-

nell. It has a large IBM computer at its "front end" as manager.

All this may seem very exotic in comparison with the mundane work asked of most business data processing machines, but David Barkal points out that vector processors are well suited to processing strings of numbers in, for example, payroll or inventory applications.

When conventional computing technology has been pushed to the limit, vector processing may be utilised to provide more processing power.

What kind of conventional big computer architectures are manufacturers offering at present? The short answer is that the hardware—the computers themselves—have become almost unimportant.

Performance

All the mainframe manufacturers—Amdahl, Burroughs, Honeywell, IBM, ICL, NCR, Univac and the Japanese Fujitsu, Nippon Electric and Hitachi—offer large computers which perform soundly and reliably. Customers might go to particular manufacturers for certain features—to Univac, for example for networking capability or to Honeywell's Multics system for security, but what has become critical is the performance of the operating system, the software which controls the functions of the computer itself.

IBM, for example, is keen to see its big machine users move to an operating system it calls MVS (multiple virtual storage), designed to "increase the integrity data security, high availability and performance of the system."

It is intended to provide good response times (two seconds or less), reliability and ease of modification in systems where several thousand terminals are attached to the mainframe.

these large computer programs, its early implementations were less than robust and ICL users are now hoping it will settle down and achieve a robust maturity.

Burroughs with its Master Control Program (MCP), Honeywell with GCOS, Univac with 1100 OS and NCR with VRX, all have mature operating systems with well-established characteristics.

Perhaps the most popular method for increasing machine performance is to use more than one processing unit—something that has only become economic since the development of the microprocessor.

The chief reasons for using multiprocessor systems are: statistically it is more effective to run a number of jobs on a multiprocessor system than to divide them between a number of unprocessors—and because of the inherent robustness to a system where the important elements are at least duplicated.

For the future, multiprocessors will be used as the basis of what has become known as data flow computers.

This is still chiefly a research concept, but it is exciting interest in Japan, in the U.S. and in this country. A data flow machine is in the final stages of completion at Manchester University (which has fair claim to be called the cradle of British computing).

The simplest way of describing data flow architecture is to consider each number to be computed as "having a tag attached describing the other number in the calculation and the arithmetical operation to be performed." The other number is similarly labelled, and the two flow through the system until they meet up and are processed. It is one approach to the difficult task of developing systems which can carry out more than one series of calculations at once, parallel processing.

The new



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ICL is offering its new Networked Product Line which will meet the growing needs of distributed processing and office automation in world markets.

**New approach to small system selling**  
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ICL is introducing new commercial initiatives, under the banner Trader Point, to encourage distributors, software and systems houses to sell ICL small computers, like the DRS 20, which starts at a simple workstation, and can grow into a fully networked system.

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New collaborations are taking ICL into engineering productivity with PERQ, personal computing with Rair, very powerful mainframes with Fujitsu, electronic private telephone exchanges with Mitel, and 'One per desk' workstations with Sinclair.

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With its new products and strategies, ICL enters 1982 positioned to be a world leader in information technology.

The new ICL. Leaders in information technology.



Alan Cane examines moves by IBM, the world's largest computer company, to take advantage of rapid technology changes.

# Colossus faces changes on an unprecedented scale

WITH A PRESCIENCE perhaps greater than he knew, Mr Robert Sobel called his book, published late last year, about the world's largest computer and office systems company I.B.M.: *Colossus in Transition* (Times Books, 360 pages, \$17.95).

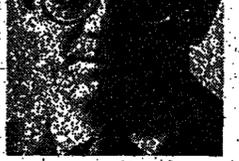
That I.B.M. is a colossus by any standards is not in doubt. Its revenues for the third quarter last year reached \$6.72bn, even if earnings fell 22 per cent to \$693m, shaking the analysts.

That it is in transition is also not in doubt and on a scale probably unprecedented since the earliest days of the company.

In October last year, it surprised the entire computer world by announcing a major corporate reorganisation.

It announced that all its U.S. marketing and servicing divisions were to be combined into one group and its development and manufacturing divisions into two other groups.

At the turn of the year it announced similar plans for the UK. The message is simple: a newly-formed Information Systems Group will market all the company's product lines, instead of three groups each with its own style of products.



Mr John Opel, IBM's president, has said that the company's restructuring would enable IBM to take advantage of rapid changes in technology and to co-ordinate long-range planning.

These were the Data Processing Division which tended to cater for large systems users, the General Systems Division which catered for the smaller computer user and Office Products Division catering for users of everything from typewriters to word processors.

IBM originally set up its trinity of marketing forces to sharpen competition within the company and, some would say, to help the company in its anti-trust suit with the Justice Department.

But while that long-drawn-out saga has played to completion the data-processing world has been changing so much that IBM, which traditionally and almost of right has held over 60 per cent of the world sales of computers, found itself with only 40 per cent of the West European market last year, according to a survey by the London-based consultancy, Logica.

The principal change is the new emphasis on smaller, more cost-effective computers. Large machines are becoming smaller; small machines are becoming more powerful. Tasks which traditionally would have been the exclusive preserve of Data Processing Division (DPD) with its array of big machines, can now be handled by the offerings from General Systems Division (GSD). And as word processors grow more facilities and take on

data processing tasks as well as office automation activities, the line between Office Products and GSD became blurred.

The result was an often unseemly scramble for the same business by two or even the three marketing divisions.

It produced confusion and irritation for the customers and public embarrassment for IBM.

Mr John Opel, IBM's president said that the restructuring would enable the company to take advantage of rapid changes in technology and to co-ordinate long-range planning.

The reorganisation came at the end of a year which had seen a remarkable spate of announcements from a company which is traditionally shy of publicity and which refuses steadfastly to what market appetites by speculating on future product releases.

One of the most significant announcements was the introduction of a microcomputer— simply called the IBM Personal Computer— designed for the home market.

There are at least three important consequences of this launch.

IBM has at last given its blessing to one of the fastest growing sectors of the computer market pioneered by companies such as Tandy, Apple and Commodore, the personal computer market had overtones of the hobbyist and the electronics enthusiast. As IBM does not cater for these categories of buyer, its introduction of a personal machine gave the market respectability and suggested IBM could see a broader future ahead.

That its future probably lies in home information and entertainment systems.

A battle is already developing between those companies who believe that information is best brought into the home electronically by videodata technology (a combination of domestic television and telephone) and those who believe that the home computer terminal is the best bet.

Both approaches are under investigation, but in the U.S. the balance seems tipped towards the home computer. Citibank, for example, has launched its home banking experiment around a computer terminal it designed and built itself. Chemical Bank is using a modified Atari 400, a home computer designed for television video games.

IBM cannot have failed to appreciate the value of the market for these home terminals, anymore than it can fail to have appreciated how many large computers will be needed to run the databanks on which the service will depend.

Significantly, IBM is big in banking everywhere and one role for the banks in home information will be to act as a central "switch" to information provided on other companies' databases.

"Personal" computing for IBM has in the past meant computing for the individual professional—a terminal on the desk and a powerful programming language like APL giving the business executive access to the power of its big computers.

IBM is, of course, back in the bureau business in the U.S. (it was legally debarred from offering bureau services for some years after an antitrust suit with Control Data) and its first satellite (it owns a third of Satellite Business Systems) has been successfully launched.

The combination of IBM's bureau processing power, coupled with datacommunications SBS and sales of personal computers in their thousands

points strongly to a future where IBM becomes one of the dominant suppliers of computer services — to the world.

Last year, the company also adopted the unusual marketing tactic of buying space at



The company surprised the entire computer world in October last year by announcing a major corporate reorganisation.

branches of Chase Manhattan Bank in New York to sell to customers: "who might not otherwise be reached by our traditional marketing methods."

The company already has its own retail stores and has begun to authorise a select group of non-IBM retailers to handle its smaller and lower priced products.

Sears Roebuck, for example, and Computerland are selling the Personal Computer. The bank selling points are expected to sell typewriter ribbons as well as typewriters and the personal machine.

It is all evidence that IBM understands very well that the

marketing methods traditionally used for large computers with high sales margins simply cannot be used with cheap, low profit products.

Office automation brings together all three divisions of the old-style IBM organisation. IBM is looking to sell its version of the office of the future in the first place to large companies with heavy text processing and file handling requirements.

The architecture it proposes is a central mainframe to control the system linked directly to a centralised database.

Text processing and manipulation is to be handled by the Displaywriter, IBM's low cost word processor, by the 8100 System, its distributed computing offering, and by the 5520 business administration system.

Eventually all of these will be able to communicate with each other and with a mainframe. Text handling will be expedited by a piece of software called DISOSS. Some of these plans are already implemented; IBM is committed to completing the pattern within three years.

Selling such a system would have cut across all the old boundaries; IBM's new marketing approach looks much more businesslike and aggressive. No part of the computer world can afford complacency when the giant of Armonk is roused.



THE principal change now being seen in the West European computer market is the demand for smaller, more cost-effective equipment. Large machines are becoming smaller; small machines are becoming more powerful.

Left: IBM's recently announced System 23, a small business system—its components include the IBM 5322 computer workstation, integrated diskette capability, 1,920-character CRT display, additional diskette storage, communication features, additional printer attachment and the interpretive language, Basic.

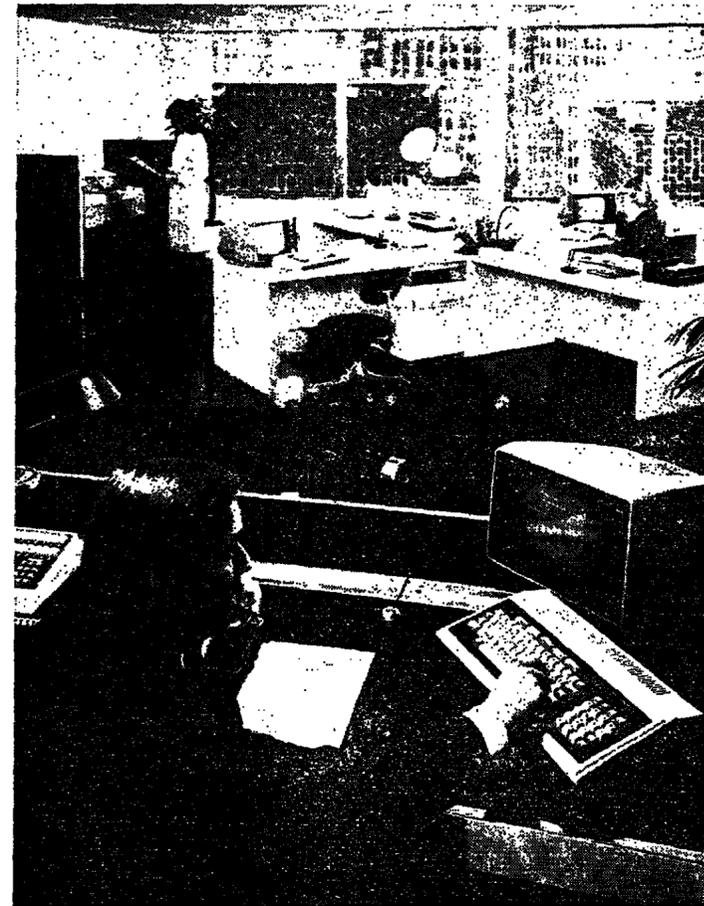
The new 5246 diskette unit contains up to two drives of 1.1 megabytes of storage each for a total capacity of 2.2 megabytes.

Models 021 and 022 can be attached to two 5322 computer workstations for file sharing.



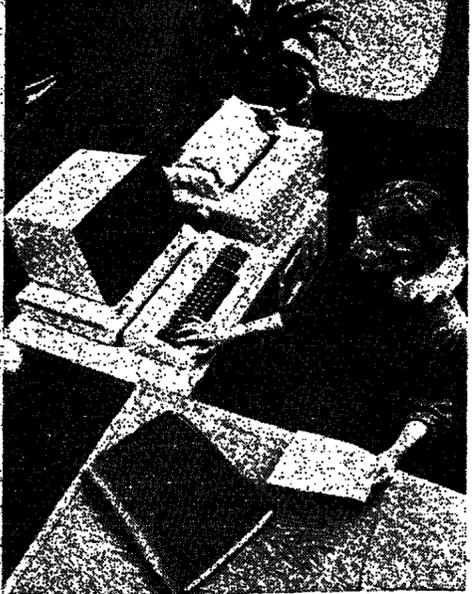
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The data-processing sector has been changing so much that IBM, which for long had held more than 60 per cent of the world sales of computers, found itself with only 40 per cent of the West European market last year, according to a survey by the London-based consultancy, Logica.

Above: IBM's series one 4952 processor, model C, which provides 32KB basic storage; one built-in diskette drive and four I/O channel positions, maximum storage of up to 128KB and a second diskette drive are optional.

# COMPUTERS VI

Louise Kehoe analyses the new breed now holding 20 per cent of the demand for general purpose central computer systems

## It pays to be compatible in a \$43bn market

**PLUG-COMPATIBLE** mainframe manufacturers (PCMs) are a relatively new breed. It is only six years since Amdahl Corporation installed its first IBM-compatible mainframe computer system, but already PCMs are estimated to hold close on 20 per cent of the market for general purpose central computer systems, currently estimated to be worth \$43.4bn.

Plug-compatible manufacturers sell equipment that can either run alongside IBM systems or replace computers built by the "blue giant." Plug-compatibles are typically defined as mainframe computers that can directly execute all applications programs and systems software written for the IBM System/370, 303X Series, or 4300 Series computers.

The driving force behind the IBM-compatible market is the more than \$300bn in existing IBM 370 user software estimated to be in place. Users want to protect their investment in software when they upgrade to a new system. This would normally tie them to IBM but now the PCMs offer an alternative. They attempt to compete with IBM by offering either faster delivery, lower cost or higher performance, while maintaining that all-important software compatibility.

Sales of IBM-compatible peripherals represent a significant

share of the total plug-compatible market. In fact, the widespread acceptance of plug-compatible peripherals designed to replace IBM's own magnetic tape units, disc storage units and printers has been a major factor in the emergence of the plug-compatible central processor market, by opening users' minds to the possibility of using non-IBM equipment alongside their systems.

### Market leader

Several U.S. manufacturers, most of them based on the West Coast, have targeted the plug-compatible market. The principal players in the market include Amdahl, which has concentrated on the high-end market segment with very high performance systems; National Advanced Systems, which matches its products to the middle range of IBM systems; Magnuson and Four Phase (recently acquired by Motorola) which both compete in the low-end portion of the market.

Amdahl is the market leader with the highest dollar value of installed systems but in terms of the number of systems installed National Advanced Systems claims to top the list. According to industry sources, National has approximately 700 installed systems as compared to Amdahl's 570 and Magnuson's

300. "What this means is that one in every seven or eight IBM compatible machines has a non-IBM central processing unit," explains Mr Floyd Kwamme, president of NAS. "Close to 80 per cent of the central mainframe computers in the world operate in the IBM environment." Kwamme estimates. Users have come to appreciate that competition from plug-compatible vendors forces IBM to hold down prices and improve performance," he comments.

But the effort of keeping up with IBM's every move—whether a price cut or a new system introduction—has taken its toll among the PCMs in the past, and many users have been reluctant to invest in systems whose manufacturers may not be around to support them in the years to come. Today the PCMs are looking healthier, although like all computer vendors they are feeling the effects of the economic recession in the U.S. and Europe.

"The market is relatively flat," says Kwamme. "The PCMs have been slightly helped by the recession because buyers are more cost-conscious. But users are delaying their purchasing decisions so shipments have not been as high as expected," he adds. NAS, which is a subsidiary of National Semiconductor, was formed in

1979 when National acquired the computer division of San Francisco-based Intel Corporation, to which it had formerly supplied computer systems.

NAS's current product line includes systems whose performance spans the 0.5m instructions per second (MIPS) to 15 MIPS range. Approximately IBM equivalent systems range from the 4241 through 3033 systems up to the 308X Series. National will augment its product line with a new system to be introduced within the next few months and aimed at the middle range of the IBM 370 systems performance capability.

### Japanese ties

NAS manufactures its medium-level systems at its San Diego factory but it buys in the higher performance systems from Hitachi in Japan. According to Kwamme, the Hitachi machines are converted to compatibility with IBM software by National. The Japanese systems account for about half of NAS's installed base.

Amdahl Corporation also has ties with the Japanese. The company is one third owned by Fujitsu. Amdahl has concentrated on very high performance machines, some of which outperform IBM's top range systems. The company uses some innovative air-cooled cir-

cuits that were developed in conjunction with Fujitsu and which the Japanese manufacturer now supplies.

Both NAS and Amdahl appear to be benefiting from their relationships with Japanese companies. In the long term, however, some analysts see a danger in U.S./Japanese joint developments of this kind, suggesting that they are merely a part of the Japanese strategy to enter—and eventually dominate—the U.S. mainframe computer market. Already both Hitachi and Fujitsu are selling IBM plug-compatible systems in Japan and many industry watchers think that it will not be long before they enter the U.S. market in their own names.

At NAS, Kwamme says that he is aware of the possibility that Hitachi may decide to market its systems directly in the U.S. at some point. "We have talked to them about it," he says. When and if it does happen, Kwamme envisages "some sort of joint investment" with Hitachi, although he is not willing to spell out the details. What is certain, however, is that the Japanese computer makers aim to expand their share of the mainframe computer market. When they do, all U.S. manufacturers, including the PCMs, will have to fight to protect their market share.

Currently, however, U.S. plug-compatible manufacturers are expanding their share of the mainframe market. According to IDC predictions, the plug-compatible share of the market will grow to 24 per cent by 1985, at a compound annual growth rate of 25 per cent. While the PCMs are expanding it is the non-IBM compatible systems manufacturers who are losing market share, according to IDC. Burroughs, NCR and other non-IBM manufacturers had an 18.5 per cent share of the market in 1979. By 1986 they are expected to have only

8 per cent of what is predicted to become a \$92bn market.

Meanwhile other U.S. companies are getting ready to enter the plug-compatible market. Storage Technology Corporation, which has until recently specialised in peripheral devices, has stated its intention of introducing a plug-compatible central processing unit. Late last year the company acquired Magnuson (the company founded by Gene Amdahl's son, Carl), thus bringing into the market. This followed an unsuccessful attempt to acquire Amdahl, which was rejected by Fujitsu.

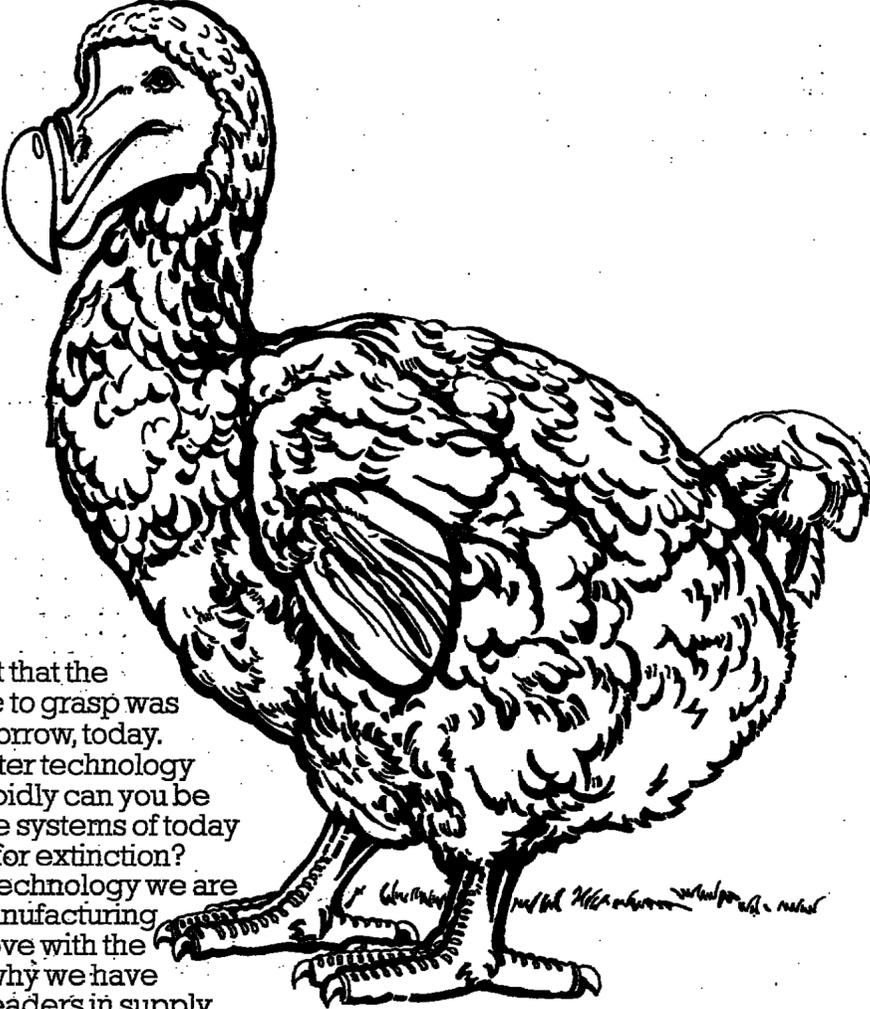
Also getting ready to join in is Trilogy, a new enterprise founded by Gene Amdahl, the founder of Amdahl Computers. Trilogy is expected to introduce a high performance system that will compete with those sold by Amdahl.

Another recent acquisition—that of Four Phase by Motorola—heightens the entry of one of the largest U.S. electronics companies into the computer business. Four Phase specialises in distributed computing systems but its Two-PI division is a strong contender in the lower end of the plug-compatible market.



A powerful and flexible small business system, the AM Jacquard J100 video-computer, is a fully expandable, multi-user system which carries out simultaneous data and word processing with communication. The equipment is manufactured in New Jersey; J100 systems in Britain range from £14,500

# EVOLUTION OR OBSOLESCENCE?



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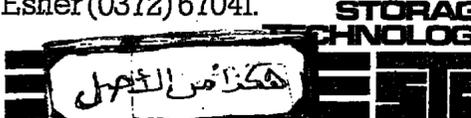
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Paul Betts examines the outlook for important mainframe computer manufacturers

## Tough times ahead for IBM competitors

"DESPITE the worldwide economic recession, the computer industry is still a major growth business," said Mr Joseph Kruger, president of Sperry Univac (the computer arm of the Sperry Corporation), in his recent year-end business statement and 1982 forecast.

The statement may, at first glance, seem banal—but for one word. Mr Kruger, whose company ranks as one of the largest main frame computer manufacturers after IBM, suggests that the industry is still a major growth business. A couple of years ago, the word "still" would never have featured in such an address. It was generally taken for granted that computers were a major growth industry and would remain so for years to come.

### Difficulties

But judging from the stock market and earnings performance of the major U.S. computer manufacturers, 1981 will be remembered as the year when Wall Street started to have serious misgivings about the growth prospects of the large computer companies. The outlook for 1982, at least in the opinion of the Wall Street electronics industry analysts, will be another difficult year for the business.

Mr Sanford Garrett, an analyst with the Wall Street investment house of Paine, Webber, Mitchell, Hutchins, says that all the large non-IBM computer manufacturers will continue to face difficulties as a result of the uncertain and gloomy outlook of the U.S. economy as well as those of other industrialised countries.

Moreover, all large main frame computer companies have been suffering from the effects of the strong dollar and currency translations which have depressed and distorted earnings. Even with the recently announced changes in the financial accounting standards board's FAS-52 accounting rule, these companies will continue to suffer from the negative impact of currency translations and the dollar in the year which has just begun.

If 1981 was a year when the computer industry lost much of its glitter among investors, it was also a year when the principal IBM competitors took stock of the changing character of the traditional computer business and market. "Each week competition in the industry becomes fiercer not only in the United States but in all the international markets," says Mr Kruger. "The traditional computer business is

evolving into the broader area of information processing where the differences between data processing and communications is continually becoming harder to distinguish." He adds that although his company expects the value of all computers installed worldwide to increase from \$136bn in December 1981 to \$217bn in 1986 (or a compound growth rate of almost 10 per cent annually). "The future in the computer industry belongs to those companies which are forward looking, trim and aggressive."

The change or rather evolution in the computer market has led to a scramble of major company reorganisations and new strategic planning. In a sense, Mr Garrett of Paine Webber suggests, reorganisations which are being undertaken by most leading main frame manufacturers—from Sperry Univac to Honeywell and most important of all at Burroughs—follow the lead which IBM has been setting in reorganising itself in the face of a changing market.

The IBM moves only surfaced last year but they have been in the making for a considerable time. With IBM sharpening its focus on the market, placing the emphasis on customer relations, becoming to all accounts far more market sensitive than it ever has been in recent years, the computer giant has signalled its intention of seeking to maintain its dominant position in the computer market. "The rest of the pack could hardly stand still," one Wall Street analyst remarked.

In the case of Sperry Univac, the computer division of Sperry embarked on a major restructuring early last year. "To date," Mr Kruger explained, "we have centralised and consolidated a number of overlapping functions throughout our organisation and have shortened the lines of communication." He adds that more significantly, Sperry Univac is changing the way it does business and improving service to customers.

But for Sperry this year will be tough for a number of specific reasons. Its fact equipment subsidiary is suffering from a poor farm cycle; its Vickers division, which makes hydraulic and fluid power systems, is expected to be sold, and Sperry Univac is in the middle of a product cycle with no major new product expected to be announced until 1983.

management in the wake of the 1981 forecast, the Whittaker group and manufacturing of all our (information systems) products."

Like Sperry Univac, Honeywell too, is regarded as being in the middle of a product cycle. But perhaps the biggest uncertainty of all concerns Honeywell's 47 per cent stake in CH-Honeywell Bull, the French loss-making main frame computer manufacturer. Honeywell is negotiating the sale of a substantial slice of its interest in the French company as a result of the impending nationalisation of Saint Gobain, the French company which controls the French computer market. But until the CH-Honeywell Bull issue is eventually resolved, the uncertainty is likely to put off new users from turning to the French company.

### Holding up

Of all the computer companies, Mr Garrett says, Control Data has held up better than most. This in part reflects the company's strong position in the peripheral business. But the business is also sensitive to the general economy and could suffer in the first half of the year. Mr Garrett, sees little economic recovery until the second half of the year and for most major computer manufacturers the pick up is unlikely to be pronounced until the end of the year or next year.

Of all the large main frame manufacturers, Burroughs have taken place. Burroughs' new market leadership of Mr Michael Rimmerford, the former U.S. Treasury Secretary. He has been strategy designed to strengthen the company, has so far involved the pruning of unprofitable and marginal operations, and reducing the company's overall debt exposure.

He has launched a massive corporate reorganisation to decentralise marketing and product development. He is seeking to improve Burroughs' customer service and make up for all the ground the company lost during the past five years or so. He also took the market place by surprise at the end of last year when he agreed to take over Memorex, the financially-troubled data storage equipment manufacturer. Although in the short run, the acquisition could hurt earnings, in the longer term the takeover could well position Burroughs more strongly in the peripheral market.

COMPUTERS VII

HEWLETT-PACKARD

Strong computer growth

HEWLETT-PACKARD is the second largest manufacturer of minicomputers, after DEC. Originally, Hewlett-Packard's main business was in electronic testing and measurement in which it is still a major force in the world.

Hewlett-Packard first began making computers in the mid-1960s when it found that its electronic instruments were becoming so fast they could no longer be read by a human operator. A computer was developed to read and analyse the rapidly-produced data.

Today, the computer business has outgrown its test and measurement division. Computers account for 49 per cent of sales, test and measurement 38 per cent, medical products 8 per cent and analytical instruments 5 per cent.

For the first ten years, Hewlett-Packard concentrated on producing minicomputers for strictly technical use. But in the mid-1970s it developed a business computer.

The HP 300 series are the company's biggest computers and used in general business applications, and are its best selling. Hewlett-Packard has not yet introduced a 32-bit computer to compete with those of companies like DEC, Data General and Prime although it is expected to do so sometime this year.

One of Hewlett-Packard's main strategies is to become a major supplier to manufacturing companies where it hopes to sell companies an extensive range of all its products from control of equipment on the shopfloor to financial information, on the largest systems.

It has just opened its first software development division in the world in Britain.

SALES AND PROFITS	
	1981 1980
	\$m £m
Sales	3,578 3,099 +15%
Pre-tax profits	586 520 +11%
	(Year end October)

After a decade of swift growth, the market looks more uncertain. Jason Crisp reports

Duller shine on minicomputer industry

THE BEARISH view of the minicomputer industry is that it will inevitably be squeezed, at one end, by the falling prices of mainframe computers and, at the other, by increasingly powerful microcomputers.

Through the 1970s a number of minicomputer companies were developed by tiny groups of computer engineers into substantial companies. While many projects fell by the wayside, the 1970s were occasionally dubbed as the decade of the minicomputer.

Digital Equipment (DEC), which has dominated the industry and spawned (unwillingly) several new companies, was formed nearly 25 years ago. In 1960 it produced its first computer aimed at the scientific and engineering community at a fraction of the price of a comparable mainframe.

Unlike IBM, it did not offer its customers for that computer more than the most basic software or any service and support. The universities and research institutions which bought DEC's first computers

could look after their own needs.

DEC's first minicomputer—the PDP 8—was launched in the late 1960s. As computer software and systems houses produced application software for the computer a new market opened in companies and organisations who could never have afforded, or justified, a mainframe computer.

DEC is now one of the largest computer companies in the world with revenues last year of \$3.2bn. The company, based in an old mill outside Boston, is still run by Mr Kenneth H. Olsen who had founded it. Hopeful young computer engineers setting up their own companies, often round Boston's Route 128 area still hope to repeat Olsen's feat or that of Data General, set up 13 years ago by Mr Edson de Castro who once designed DEC's minicomputers.

The minicomputer manufacturers often succeeded because of high sales to the original equipment manufacturers

(OEMs) which wrote applications software, installed and serviced the minicomputers. OEMs account for more than 50 per cent of sales of some manufacturers.

It meant that companies like DEC, Data General and Prime could expand manufacturing rapidly with a smaller burden of sales and support staff. But as the companies have grown, and the market has become softer, the manufacturers have become keener on selling to the end-user of their products, and avoid paying the OEM high discounts.

The growth rates of 40 per cent and more of the 1970s have begun to look less impressive. The shine, says one analyst, has come off the minicomputer industry. "But not because of the squeeze from mainframes and microcomputers. Not yet anyway."

Softening demand from the OEMs and recession in the U.S. and Europe together with high interest rates are blamed. Even DEC, which seemed at first

immune to problems affecting the industry last year, has seen its once over-long backlog of orders pared thin.

The minicomputer manufacturers are looking to a new battleground where they will face formidable competition head on. Last year a number of leading manufacturers of minicomputers including DEC, Hewlett-Packard, Data General and Wang declared their strategies in office automation and demonstrated a range of products which either are or shortly will be available.

The competition is across the board and not just from other computer manufacturers. It ranges from IBM and Xerox to tiny companies with specialist innovative products and systems and includes the telecommunications industry.

The market for office automation equipment remains relatively small. Several potential users of office automation are showing considerable interest but it is mainly confined to the largest companies in the U.S. and Europe.

When the minicomputer manufacturers announced their office automation products in the U.S. last year most were aiming for the Fortune 500 companies—as everyone else is.

The minicomputer manufacturers are beginning to feel some tougher competition from microcomputers although it only represents a very small part of their total business. The manufacturers of the so-called supermicros are selling to potential minicomputer customers at significantly lower prices. In other words they are trying to do the same thing to the minicomputer manufacturers as they themselves did to the mainframe computer companies previously.

The supermicros—with 16-bit microprocessors—are twice as fast as the standard microcomputers like those from Apple, Tandy, Commodore and Sinclair which are based on eight-bit microprocessor chips.

One of the main advantages of the supermicro over the "standard" microcomputer is that it can be used by up to

five people at once as opposed to one. A number of companies are manufacturing supermicros including Altos, Vector Graphics and Convergent Technology in California. Britain's large computer company ICL is to manufacture under licence a supermicro, made by Three Rivers a small U.S. company.

Although the minicomputer manufacturers may be suffering a squeeze they, too, are producing both smaller and larger computers.

The fastest growth area in minicomputers is in powerful 32-bit machines. DEC which launched its 32-bit VAX family four years ago has the largest share of the market.

As minicomputer manufacturers widen their product ranges from powerful 32-bit machines to small word processing micros and office automation so new competition encroaches on them and the boundaries between the different categories of computer manufacturer become increasingly blurred.

DATA GENERAL

Changing its tough image

UNTIL THE LATE 1970s Data General used to revel in its reputation as the roughest and toughest company in the minicomputer business. It could afford to as it had a startlingly fast growth rate and exceptional profit margins, notably better than Digital Equipment the industry leader.

Until the middle of fiscal 1979, Data General's pre-tax margins were about 20 per cent, but by 1981 these had been more than halved. Sales growth fell nearly 50 per cent in 1976 to 13 per cent in 1981. Profits in 1981 fell to \$40.9m from \$54.7m the previous year.

There were a number of reasons given for its fall. The company pointed to the weakness of the minicomputer market and exchange losses. In addition it faced a number of other problems including too centralised decision-making, slowness in introducing a 32-bit minicomputer (it was about three years behind DEC), costly litigation and an overdependence on selling to original equipment manufacturers (OEMs).

There has been significant reorganisation of the company which has been split into three divisions, one selling computers to large companies and for scientific applications, another to small businesses and a third to OEMs. There have been a number of management changes and decentralisation.

Before the reorganisation Mr Edson de Castro, the founder who had designed the PDP 8 minicomputer at DEC, was criticised for taking all the decisions. The company's 32-bit minicomputer is selling well, although in much smaller numbers than DEC's. It has also gone out of its way to live down its rough tough image and pay greater attention to customer satisfaction.

SALES AND PROFITS		
	1980 1981	% change
	\$m £m	
Revenues	633.9 736.9	+13
Net income	54.7 40.9	-25
	Year ends September	

DIGITAL EQUIPMENT

More diversification

DIGITAL EQUIPMENT was the first company to produce minicomputers successfully. It has dominated the field ever since with a meteoric growth that has made it one of the largest computer companies in the world.

DEC will celebrate its 25th birthday later this year when it expects to complete its financial year to the end of June with revenues of about \$4bn and possibly be the second largest computer company in the world. IBM is many times larger.)

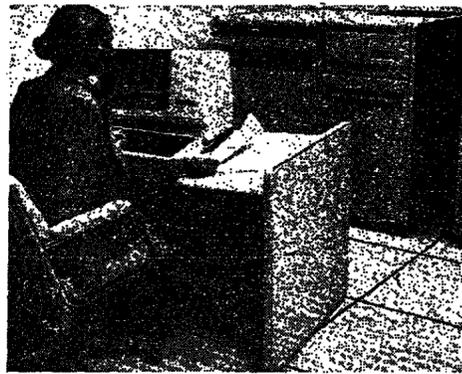
While other minicomputer manufacturers have been squeezed by the recession and high U.S. interest rates causing customers to defer purchases DEC has continued to advance. In the first quarter of the current financial year profits soared 58 per cent, partly due to substantial interest income and also cost cutting.

SALES AND PROFITS

	1980 1981	% rise
	\$m £m	
Revenues	2,4bn 3,2bn	35
Net income	250m 343m	37
	Year ends June	

One effect of the recession is that DEC has been able to cut its very long lead times of over a year to deliver a computer down to several months. Although the company's strong growth has been based on a number of products including the PDP-11 minicomputer and its disc drives the greatest success has come from its 32-bit VAX minicomputer introduced four years ago. But even DEC is having to tighten its belt.

Increasingly IBM is becoming a more direct competitor for DEC. Late last



The VAX 11-750, one of Digital's powerful mid-range computers

year DEC announced its strategy for the office automation market where it will meet not only IBM head on but a host of other companies. DEC employs more than 63,000 people worldwide, of which about 3,000 are in the

UK. Last year the company spent \$396m on new buildings and equipment, some 90 per cent higher than the previous year. This is expected to rise to \$500m in the current year according to Mr Kenneth H. Olsen, DEC's president and founder.

SYSTEME

Advance continues

SYSTEME is the second largest UK owned computer company after ICL, which is many times its size. After an uncertain start in the early 1970s it has grown rapidly. In its latest results, just published, sales rose by 33.5 per cent to £32.1m.

Systeme began in 1972 as an original equipment manufacturer using DEC computers providing turnkey systems to a range of small businesses. It began its own manufacture of a limited number of components in 1975 and now makes most of its own printed circuit boards, video display terminals, and cabinets. DEC still supplies the central processor for its minicomputers.

Systeme has also developed, and begun producing, a micro-computer for small business, independently of DEC. It is selling a number of

manufacturing control systems including a flexible machining system which can control robots and machine tools linked to an automatic conveyor.

The National Enterprise Board—now part of the British Technology Group—bought a 26 per cent stake in Systeme in 1977 for £500,000. About a year ago, when another major block of shares were sold to a Scottish Investment house, the NEB's holding was valued at £5.3m.

Based in Leeds, Systeme is building a new factory costing £30m over a period of four years. It is being financed by a loan from the European Investment Bank, selective grants from the Department of Industry and internally generated funds.

Systeme is expected to go public in about three years.

SALES AND PROFITS		
	1981 1980	
	£32.1m £24.06m	(+33.5 per cent)
Turnover:	£32.1m	£24.06m (+33.5 per cent)
Trading profit:	£2.2m	£1.6m (+40.0 per cent)

GOODBYE DATASAB

- What's happened?
- Datasaab is no more.
- What, the company?
- No, just the name.
- Well, haven't you got a new name?
- Of course. We were given it as a new year's present.

HELLO,

ERICSSON

INFORMATION

SYSTEMS

-Datasaab? Ericsson Information Systems? What's going on?

-Yes, it is a bit complicated at first. I'm not really used to it myself yet. Let's take it word by word. You start.

-Datasaab. Let me see. To me Datasaab means Alkaskop and bank terminals. And business systems Series 16. And didn't I read something about you being taken over by some telephone company?

-That's right. Ericsson. Although "some telephone company" is no way to talk about one of the world's leading telecommunications suppliers. The Ericsson Group has over 70,000 employees spread throughout 100 countries. So we're not lacking in resources. Or technical knowhow.

-OK, then I suppose the word Information refers to this new office automation age the papers have been full of lately. Just about every computer supplier is talking about systems that can communicate with each other, no matter where they are, and telephones and telex and distributed data processing and...

-You're on the right track. But watch out for the people who sold that very fine cloth to a certain king. They're still around. And for others making claims they will have a hard time justifying. To make the kind of systems we're talking about demands a very high level of system knowhow. It also demands access to considerable resources and the ability to coordinate them within a number of decisive system areas.

-Systems?!

-Ericsson Information Systems! A completely new company created by the Ericsson Group through a merger of three different company units, each with a unique area of competence needed to develop a genuine integrated information system. You'll hear from us soon.



## COMPUTERS VIII

The microcomputer business is now a major industry with world-wide sales of more than \$1bn. Guy de Jonquieres reports

# A success story that surprised the giants

THERE HAS probably been no more forceful demonstrations of the practical consequences of the microelectronics revolution than the phenomenal growth of microcomputers. From humble beginnings in the mid-1970s — when the first machines were quite literally put together in back rooms and private garages — the microcomputer business has mushroomed into a major industry with world-wide sales of well over \$1bn a year.

This vertiginous growth rate seems set to continue, perhaps even to accelerate, in the coming decade. In the U.S., which already accounts for 40 per cent of microcomputers in use world-wide, annual sales will reach about 2.6m units in 1983, three times more than in 1979, according to International Data Corporation, a market research company.

Dogmatic product definitions can be misleading in an industry as fast-moving and as protean as computing, and it is becoming increasingly difficult to identify

the frontiers which separate microcomputers from other types of data processing equipment. The term is generally applied to machines compact enough to sit on or under a desk, costing up to £15,000 and usually dedicated to a single user.

But within these broad parameters lies an increasingly wide range of equipment. At the lower end the hugely successful British-made Sinclair ZX-81, which sells for less than £70, is undoubtedly a microcomputer, though its limited speed and processing power make it more suitable as a learning aid than as a problem-solving device.

In the middle of the market there is a wide choice of micros which, when equipped with appropriate software and memory capacity, can undertake a range of useful data processing tasks. These include accounting, stock control, financial planning and word processing.

At the upper end of the price range are to be found machines

designed for scientific and professional users, including engineers and architects. Such machines offer high performance for their size and increasing feature display screens which can show detailed graphics, including three-dimensional simulations.

## Pioneers

An example of this newer type of microcomputer is the Persi, developed by Three Rivers of the U.S. which is to be made and sold under licence by ICL of Britain. At present the Persi costs £25,000 in the UK though the price is expected to fall sharply once it enters volume production.

The microcomputer market was pioneered by young, entrepreneurial companies like Apple, Commodore and Tandy. Radio Shack of the U.S. Their founders were in many cases youthful electronics engineers who were enthusiastic about the potential for applying microelectronics to computing but had

little previous business experience.

The huge success of their products took them — and many of the established giants of data processing — by surprise. During the early years of the microcomputer boom, most of the mainframe manufacturers from IBM down stood on the sidelines, apparently uncertain how to tackle this new market.

For big companies, used to selling expensive systems to professional customers, to gear themselves to selling microcomputers entailed a big change of attitude and organisation as would be required of a manufacturer of printing presses who decided to diversify into typewriters.

Some of the early attempts proved disappointing. Texas Instruments, though a major manufacturer of electronics products from chips to calculators, found it hard to penetrate the microcomputer market. Significantly, Texas' first machine did not succeed, partly because the company insisted on trying to

provide most of the software for it. The microcomputer pioneers, with their shoestring resources, relied on outsiders to write software for their products.

But the bigger computer manufacturers recognised that the market was becoming too important to be ignored for much longer. Perhaps the single most important event of 1981 was IBM's decision to launch its Personal Computer, which will compete directly with Apple, Commodore and the others.

The machine marks a new departure for IBM in more ways than one. The company has long been used to setting the pace in its traditional markets. But the new Personal Computer bears many signs of having been designed after a careful study of rival machines to select and incorporate their best features. Furthermore, IBM is clearly making no attempt to monopolise the supply of software for it — on the contrary, it is actively encouraging software

companies to write programmes for it.

IBM's major product announcements are often awaited with some trepidation by its competitors. But in this instance the reaction of other microcomputer manufacturers has been symptomatic of the buoyant mood of the industry.

## Welcomed

Most, after inspecting it, have pronounced it a good and well-priced machine which should sell well. But far from expressing concern that IBM would dominate the market, other companies have forecast that IBM's muscular marketing effort would help to raise the level of microcomputer sales overall.

Until now, manufacturers say, most microcomputers have been sold to small- and medium-sized businesses, which used them as self-contained machines to carry out a range of tasks. If such businesses had used computerised systems at all in the past, many would probably have

entrusted these operations to computer bureaux.

There is still plenty of room for growth of this market, which is certain to remain a mainstay of microcomputer sales for a number of years. The potential in the UK has been underlined in a recent study published by Lancaster University's Department of Marketing, which estimated that only 10 per cent of small British companies have their own small computers.

But other market sectors are developing fast. At the bottom end of the market, the success of the Sinclair ZX-81 has demonstrated that a big demand exists among the general public for an inexpensive home computer. Commodore recently launched a £200 machine, the VIC-20, and it will be surprising if the Sinclair does not attract direct competitors in the near future.

At the other end of the scale, a number of large companies are now planning to buy microcomputers for use as workstations for professional staff

and managers. In many cases the machines will be linked together in networks by means of circuitry which will enable data to be transmitted between them.

This type of system allows a considerable increase in the processing power available to the individual user, all the more so if the microcomputer network is connected to a large data processing installation. It also permits the microcomputer to be used as desktop terminals of electronic mail.

In the U.S., where telecommunications is cheaper and less hedged around by regulatory prohibitions than in Western Europe, many microcomputers have already been plugged into the telephone network.

The owners are able to tap into a wide variety of data bases all over the country and to communicate with each other. Hobbyists have started computerised sales and wanted services, while professional users regularly trade software over the telephone network.

## Pocket calculator pioneer

SINCLAIR RESEARCH was formed in 1979 by Mr Clive Sinclair, the 41-year-old entrepreneur who has had long experience of the fiercely competitive world of consumer electronics. It was Sinclair who introduced the world's smallest television set, a black plastic digital watch, and, was among the first to sell pocket calculators in the UK.

Having cut his association with his first company which was partly owned by the then government owned National Enterprise Board, Sinclair

astonished the world by introducing the cheapest personal computer on the market, the ZX 80.

Costing about £70 the

**sinclair**

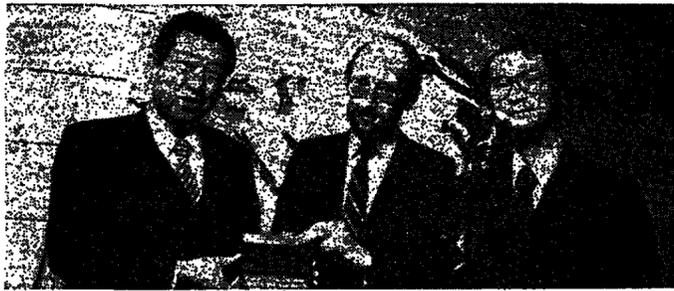
machine was ideal for people who wanted to learn about the basics of computing before committing themselves to a more powerful machine.

Early in 1981, a second model, the ZX 81, was introduced

aimed at the same market but offering greater flexibility for the user. This machine has been sold throughout Europe and the company claims that production is running at a rate of about 500,000 a year.

In October last year Sinclair Research concluded a deal with Mitsumi to export the ZX 81 in volume to Japan. It aims to sell 20,000 in the first year and 50,000 the next.

In addition to its Japanese connection, the company has also agreed to supply machines to American Express for its mail order business.



Centre: Mr C. Sinclair, founder and chairman of Sinclair Research; left: Mr M. Ohtaki, assistant general manager, London branch and managing director of Mitsumi Machinery Sales (UK); right: Mr H. Shimizu, manager of Mitsumi Computers

## BBC is partner for teach-in series

ACORN IS a British company founded in Cambridge three years ago. Originally the company marketed the Atom, a personal computer which was made in Hong Kong.

Recently it began full production of the microcomputer it has designed for its partnership with the BBC for a computer teach-in series which will begin early this year. The television series was delayed for about a month because of the unexpected heavy demand from the public to buy the computers.

Acorn has doubled its production to 10,000 a month through manufacturing agreements with ICL at Kidsgrove and Clearstone at Newport. The company's products are aimed very much at the educational and home markets and was chosen as a preferred machine for schools by the Department of Education which aims to put a microcomputer in every school by the

end of 1982.

Schools get 50 per cent support from the DoE for the cost of buying a computer if they chose Acorn or Research Machines computers.

The company was set up by Mr Hermann Hauser, an Austrian, and his friend Mr Chris Curry. They met at Cam-

**ACORN**

bridge when Mr Hauser came to learn English and later completed his PhD at Kings College.

Its first product was called System 1 available through mail order followed by its Atom microcomputer. Sales in 1980 were £1.4m with profits of £230,000. This year the company expects to achieve a turnover in excess of £5m.

## Tandy

Exploiting greater use in the home

COMPETING with Commodore and Apple for the leading position in the microcomputer market is Tandy, the radio and electronics goods group which retails through its own outlet chain.

Tandy began selling computers in 1977, following the slump in the U.S. sales of citizens' band radio equipment which had gone through a period of rapid growth in the early to mid-1970s. Tandy saw the home computer as the emerging market and therefore developed its own systems.

Today, personal computers accounts for about 15 per cent of total sales which in the year ended June 30 1981 were \$1.7bn, an increase of 22 per cent on the previous year. Profits at \$189.6m had improved by 51 per cent over the previous year.

## Expansion

Tandy had its beginnings in a leather goods and crafts business in Fort Worth, Texas, but it bought Radio Shack, a Boston-based company with nine shops and a mail order business, in 1963.

Now there are about 6,700 Radio Shack outlets in North America, plus some 750 Tandy shops in Europe, Japan and Australia, with a further 475 shops planned.

In 1981 Tandy introduced three microcomputer models ranging from a hand-held computer (made and designed in Japan), a business machine and a microcomputer aimed at the home-user market.

Since microcomputers continue to be an expanding area for sales, Tandy is likely to increase its efforts in associated telecommunications and computer products.



The £40 "Apple Writer" word processing programme in use.

## A fruitful way to education

STEPHEN WOZNIAC and Steven Jobs were computer hobbyists who set up business in 1976 to sell the microcomputer they had designed.

Mr Jobs sold his car and programmed calculator to raise the US\$1,200 capital to set up business in a garage.

Five years later the company's earnings rose to

**apple**

\$39.42m and the name Apple is widely known in the business world. Early in the company's development the two men realised that they were on the threshold of a multi-million pound business and sought the help of professional managers such as Mr Mike Markkula who became chairman of the company.

More than 2,500 employees work for Apple with manufacture of microcomputers in

the U.S., Singapore and Cork which are sold through 4,000 dealers worldwide.

By the beginning of December 1981, Apple had sold more than 300,000 microcomputers since 1977 with a strong bias towards the educational market which is the largest market for such equipment after the business sector.

In fact, the company set up a non-profit foundation to help support the development of microcomputer projects in education and training. In 1981 the company provided the equivalent of \$400,000 worth of development for computer assisted learning systems.

However Apple does not limit itself to the educational field although it claims to be the leading company in this sector. Like its main competitors, Tandy and Commodore, it seeks professional users because applications in industry and commerce dominate the whole of the micro-computer market.

## Superpets for businessmen

Among the three leading microcomputer manufacturers, Commodore stands out because it has a long history of survival in the consumer electronics field. It came through the fierce pocket calculator price-cutting war of the mid-1970s which spelt disaster for many other electronics companies.

In 1981, Commodore achieved its best-ever sales results of \$186.5m which was 48.5 per cent higher than the previous year. Much of this sales growth is accounted for by sales of microcomputers and associated systems. Microcomputers accounted for 71 per cent of overall sales compared with 66 per cent in 1980 and Commodore expects

that the percentage will increase even further this financial year.

Yet it was only four years ago that the company introduced its first microcomputer selling for less than \$1,000.

When it entered this market it tried to sell its system at the lowest price to discourage competition at the outset in the hope of avoiding the price wars of previous consumer goods. As with other manufacturers the company has found that a substantial num-

ber of its systems go to the business world.

Its machines are the PET and the VIC models which come in many different versions. In 1981 it introduced two models the VIC 2 which Commodore describes as a colour computer for the price of a home video game. This is intended to attract the home users who may not be bored with their video cassette recorders. The second machine is a superpet which is aimed at the business community, because professional applications of microcomputers are likely to remain the largest market for the near future.

**commodore**

duced its first microcomputer selling for less than \$1,000. When it entered this market it tried to sell its system at the lowest price to discourage competition at the outset in the hope of avoiding the price wars of previous consumer goods. As with other manufacturers the company has found that a substantial num-

# Have you recently found yourself becoming an involuntary non-profit organization?

The earnings reports of many companies are experiencing a widespread outbreak of parentheses. (We mean those depressing bow-legged punctuations that signify operating losses in balance sheets.)

In fact the problem of diminishing profitability is widespread enough to have acquired an aura of immutability, something like a law of contemporary economics...making it sound almost audacious to suggest the problem is solvable.

Perhaps it's time for a little audacity...and a Data General ECLIPSE® computer.

ECLIPSE is a complete information system that will never be accused of insufficient ambition: its mission is to help cause immediate and dramatic improvement in your bottom line.

It does this by helping you instantly identify

inventories carried unprofitably, back orders being filled tardily, cash flow problems...those areas where profits often erode unseen by management.

It isn't surprising, then, to find an ECLIPSE computer turning up in so many profit-making organisations, like Express Dairy Foods, North Thames Gas and Guinness Group Sales (Ireland).

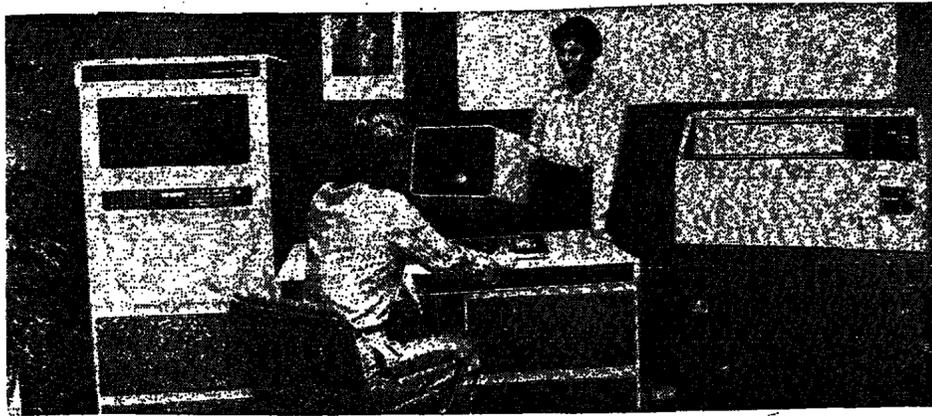
In fact, many of the largest and most successful British companies in banking, industry, distribution and services are using Data General computers. Is this a stunning coincidence or a considerable profit opportunity?

Those who still believe in opportunities are invited to write for particulars to: Marketing Communications, Data General Limited, 3rd and 4th Floors, Hounslow House, 724-734 London Road, Hounslow, Middlesex TW3 1PD. Tel: 01-572 7455.

**Data General**  
COMPUTERS

مكتبة النور

# COMPUTERS IX



Production tests (left) being made on ICL's ME29 range of high-performance, multi-purpose, medium powered computer systems. Right: the ME29 range, showing the processor cabinet, which contains the central processor, plus up to 1m bytes of main store; a new, multi-purpose workstation is on the control desk which also houses the Module 10 fixed disc stores. On the right is a PBS line printer

Every new product must be designed to communicate across the network with all other equipment in its range

## The web ICL believes is worth spinning

THE PAST year has been a testing one for many manufacturers of large "mainframe" computers. For Britain's ICL, which is Europe's only indigenous mainframe company, it almost proved fatal. Battered by a serious reverse in its fortunes, ICL plunged deeply into loss and for a period early last year seemed in danger of collapse.

The company is now fighting its way back. Its energetic young managing director, Mr Robb Wilmot, who was appointed last May, has been working at high speed to reorganise its product range and to cut costs by shedding staff and trimming overheads.

Its new chairman, Mr Christopher Laidlaw, a former deputy chairman of British Petroleum, has been struggling at the same time to bring the company's finances back on an even keel. Like Mr Wilmot, he was appointed at the instance of the Government, which granted ICL a £200m loan guarantee last March to enable it to continue borrowing.

The company's results for the last financial year to the end of September were predictably disastrous. A net loss of £153.1m, down from a profit of £11.1m, down from £72.5m the previous year.

The loss included an extraordinary charge of £78.1m to cover the costs of almost 7,000 jobs cuts, factory closures and other rationalisation moves.

Mr Laidlaw has declined to make a profit forecast for the current year, though he expects losses to continue during the first half. But after its recent painful surgery, the company clearly believes that it has come through the worst and can now look forward to a steady return to health. It hopes to return to profit within the next year, even if there is no improvement in the general economic situation.

City confident  
Its confidence appears to be shared by City institutions which were until recently very bullish about its prospects. Last month, they enthusiastically supported a £32.1m rights issue to enlarge ICL's shrunken equity base, though the issue was admittedly priced at a bargain basement level.

Equally important, customer confidence appears to be flowing back. Turnover rose slightly in the second half of last year, after falling in the previous six months. Reassuring customers has been one of Mr Wilmot's top priorities. To do so he has

taken the step, highly unusual in the computer industry, of setting out publicly his new product plans up to the mid-1980s.

When Mr Wilmot took over, ICL had not only been ravaged by a combination of recession, high interest rates and the strength of the pound; it had also been weakened by the burden of developing and sustaining its range of larger computers, which had absorbed most of its financial and technological resources and left it poorly placed to compete in a market where growth was increasingly coming from smaller machines.

Mr Wilmot is adamant that ICL must remain a supplier of mainframe computers, which he believes will continue to play an important role in tomorrow's market. But he has taken steps to streamline its product range, by reducing the number of medium-sized mainframes from eight to three, each of which can be upgraded in power. He also plans to extend ICL's product line upwards to include very powerful computers which will compete directly with the biggest machines which IBM has to offer.

His philosophy is based on the conviction that the future trend in computing is towards networked systems, which will link together a wide variety of information-processing equipment, from the biggest mainframe down to desktop microcomputers and terminals designed to handle both voice and data communications.

A central tenet of this approach is that every new product which ICL introduces must be designed to communicate across the network with all the other equipment in its range. Furthermore, ICL products must also be able to communicate with equipment manufactured by other companies. An important Wilmot objective is to surround equipment made by other manufacturers, particularly IBM, with ICL machines.

**Bold strategy**  
This is a bold strategy, whose implementation requires resources much larger than those which ICL can muster on its own. It calls for an aggressive entry into fields in which ICL had little practical experience, notably office equipment and telecommunications technology.

Clearly, too, it involves an element of risk, since Mr Wilmot is not trying just to catch up with the current state of the market but to anticipate and intercept future developments in technology.

To help put this programme into effect, Mr Wilmot has turned to other companies for products and technology. His principal bargaining counter has been the appeal of ICL's international marketing network and customer base, the most extensive of any computer company outside the U.S. and Japan. During the latter half of last year, he concluded a rapid-fire succession of "collaborative agreements" with other companies notably:

● With Fujitsu, one of Japan's leading electronics groups. Fujitsu will supply ICL with microchips and semiconductor technology—which Mr Wilmot says is the best in the world—to be used in ICL's new range of mainframe computers. Fujitsu is also acquiring ICL's only microelectronics plant, in West Gorton, near Manchester.

● With Mitel, a fast-growing Canadian manufacturer of electronic private exchanges (PBXs). Mitel will supply a powerful PBX, which ICL plans to market outside North America from 1983, and may itself market ICL's new DRS small business system.

● With Three Rivers of Pittsburgh, a small American venture capital company. ICL has secured manufacturing and marketing rights on the Three Rivers Perq, a powerful professional microcomputer. ICL will contribute to the further development of the Perq and to the design of a low-cost version.

● With Sinclair Research, manufacturer of the phenomenally successful £70 ZX-81 microcomputer. The two companies will develop jointly a sophisticated low-cost voice and data terminal, to be attached to the Mitel PBX, which will incorporate a flat display screen using Sinclair technology. The screen will measure about 12 inches across but only one inch deep.

● With RAIR, a small British company, ICL is to make and market from early this year a personal computer already being produced by RAIR, which is expected to sell for less than £2,000.

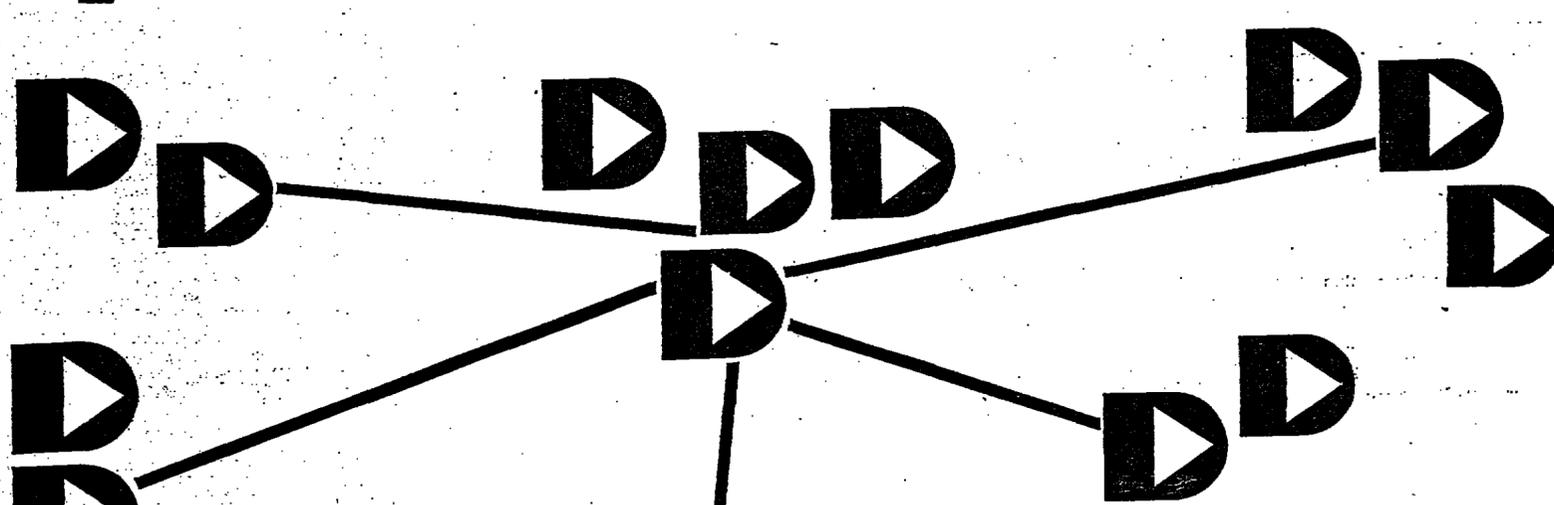
The one significant gap still to be filled in ICL's product line is word processors. It has been discussing possible collaboration with several companies, including Logica, a leading British computer systems house. Logica designed a well-regarded word processor for Nexos, the National Enterprise Board's beleaguered subsidiary which was set up three years ago to market advanced office equipment.

Most in the industry agree that the new strategy is well-conceived and have been astonished by the speed at which its main elements have been brought together. The clarity of Mr Wilmot's thinking has won widespread respect, as has his inexhaustible capacity for hard work. Characteristically, he spent most of his Christmas break on a selling mission to the Middle East and Asia.

**£200m loan**  
ICL's financial position, though still precarious, looks better than it has done for some time. The Government recently agreed to extend its £200m loan guarantee, which was originally for two years, to five years, though on a reducing basis.

# LOCAL NETWORKS

## Datapoint have already installed 1,800.



Computer companies have suddenly discovered the Local Network! Every business is going to need one, they say. Not just because Local Networks improve efficiency and profitability, but because they adapt so readily—and economically—to the changing needs of the business as it grows.

Well, we've got news for other computer companies, Datapoint are doing more than just talk about Local Networks; we're installing them. Six of them every month, in the UK. And we've been doing it for the last three years.

Datapoint is one of the largest and fastest growing computer companies in the world. We employ

over 6,000 people and serve over 30,000 users. The companies that rely on us include Guinness, John Laing, Marathon Oil, Manchester University, P&O, BOC...and many more.

Why? Because our minicomputer systems solve problems for them. Because our software makes them more efficient and more cost effective. And, above all, because ARC, our Local Network, allows them to develop advanced stages of office automation as they grow and as their needs change.

You see, you never have to replace Datapoint computers; you just add to them.

If you'd like to know more, we'd be happy to tell you. Or ask your D.P. Manager about us. If he knows computers, he knows Datapoint.

# DATAPOINT

COMPUTERS WITH A FUTURE.

COMPUTERS X

# CARRYING THE FLAG FOR BRITAIN'S COMPUTER INDUSTRY.

There's a popular misconception that the British computer industry is suffering the same fate as our car industry: in danger of being overwhelmed by big American and Japanese corporations.

competition, we're winning major blue chip business: complete systems for the Dutch Government Computer Centre, British Petroleum and Blue Circle Cement and we've taken America by storm with 'SYSTEL', Systime's unique teleprocessing system.

Granted, Britain's 'other' big computer company has had a few troubles lately, but not Systime. Systime is exceptionally successful - and British! At home recent major contracts have included installations for INMOS, Jodrell Bank, Minster Insurance, The University of Manchester and a highly complex system to link five of London's major teaching hospitals.

And Systime's innovation and product development can be seen throughout its entire range; right down to its new 'baby' micro the S500, small business computer. The S500 based on revolutionary new technology developed by Systime has double the power and capacity of other small business computers at its price.

Worldwide, against fierce international

In short, don't worry. Systime is now carrying the flag for Britain's computer industry.



# SYSTIME

LEEDS: Systime Limited, Concourse Computer Centre, 432 Dewsbury Road, Leeds LS11 7DF. Tel (0532) 702211  
LONDON: Systime Limited, Systime House, 15/23 Baches Street, London N1 6DL. Tel: 01-251 6233



## Teleputer

ONE of Britain's most successful computer manufacturers is Redifusion Computers, which last year launched its "System Alpha." Mr Mike Aldrich, left, the company's managing director, is seen at home with one of his "teleputer" terminals, which has been described as a "revolutionary new range" of videotext devices that Redifusion believes will also be at the centre of the home information system of the later 1980s.

The teleputer terminals combine broadcast television, video cassette recorder, video disk and telecommunications technologies with personal computing.

Significant developments in Britain. Alan Cane reports.

## A sudden increase in UK micro manufacturing

ONLY A FEW years ago, writing an article of this kind was simple. The British computer industry was ICL, together with a leavening of small computer makers, none of them very successful, all of them with precarious finances.

Much of that has changed. ICL has been forced to accept a humbler attitude to the world outside and some of those small manufacturers are looking like winners in their own right.

But the major change has been the sudden surge of British microcomputer manufacturers. Once UK electronics specialists got to grips with microprocessors, they showed a talent equal to that of any country in applying them.

One example of the imaginative use of microprocessor chips is the Husky 144, a portable computer launched only weeks ago by DVW Micro-electronics of Coventry.

The Husky is meant to be used in tough conditions; its specification would not disgrace a computer built to military standards. According to Mr David Viewing, DVW managing director: "It is housed in

a lightweight cast alloy aluminium case that is impervious to moisture, dust and abuse. It is truly programmable with a large, built-in liquid crystal display screen and a resident Basic interpreter."

The computer is already generating interest from construction companies, surveyors and the like. It could prove worthwhile competition for the very sophisticated dedicated calculators of the kind made by Hewlett Packard.

Mr Clive Sinclair moved from pocket calculators (and watches and pocket televisions) to small, if not pocket-sized, computers. His ZX80, and its successor the ZX81, shows innovation unmatched by any U.S. home computer company and quality sufficient for the machines to be marketed in Japan by the Miami trading corporation.

The Sinclair machines are distinguished by two features: a version of the Basic computer language ingeniously contracted so that it works on such a small machine; and a technique for cramming all the supporting circuitry for the microprocessor on to four chips, so cutting material and fabrication costs.

880Z which is well thought of in education and research. In fact, the 880Z is the standard educational microcomputer in many London schools.

These companies, and a host of others including LSI Computers and Trivector Systems, are proving that the UK can hold its own at least in the design of microcomputer systems.

The distributors are perhaps best exemplified by Comart, a Cambridgeshire-based microcomputer manufacturer and distributor.

It is typical of a number of UK companies who have taken the best of the U.S. microcomputers and made a success of applying them to the UK market. Comart specialises in Cromemco machines, one of the best regarded U.S. business micros.

What of that clutch of mini-computer companies? The major success story is SYSTIME, a Leeds-based company which has grown from being a Digital Equipment OEM (a company which incorporates the guts of another company's products in its systems) to something approaching independence.

It was started by Mr John Gow, formerly a DEC (UK) salesman, who made the critical observation that DEC was building the best minicomputers in the world but failing to exploit their potential in the commercial world. (Minicomputers were, in the beginning, the brain children of engineers and scientists. A whole raft of U.S. minicomputer companies grew rapidly in the 1970s, then stumbled as their engineers failed to come to terms with the realities of business. DEC came through unscathed.)

Systime started by developing commercial applications software to run on DEC computers. It then moved into the business of building its own computers based on DEC chips.

Mr Gow also realised that one part of the future for business computing lay in terminals and stand alone devices for use in shops and other places of business. It has now developed a line in modular terminals based around Intel microprocessors and has launched its own 16-bit microprocessor.

Systime's success is based on a shrewd appreciation of market needs, quality systems implementation and good maintenance.

It reward will be a turnover this year in excess of £30m, after early days in which its finances were so precarious that it needed a heavy cash injection from the old National Enterprise Board (now merged into the British Technology Group).

GEC, the UK's major electronic company, makes a line of well-engineered minicomputers, the 4000 series; but the company has frequently seemed ambiguous in its approach to the

### Modular One

Computer Technology was started by a group of ex-Elliott Automation employees including the remarkable Iain Ramon, now director of strategy for Inmos, the state-backed chip-making venture. Mr Ramon assigned a "computer, the Modular One, which proved first class for scientific work and which is still the basis of the company's 8000 series machines today.

After years of sound but lacklustre performance, chiefly due to scientific rather than commercial leanings, the company became part of the Information Technology group three years ago.

Digitec is another UK mini-computer maker which has traditionally looked for markets in research, medicine and education. It is also one of the few UK computer makers to supply computing hardware on an OEM basis to other manufacturers - the list includes IBM, Price Davidson, AIM and Technics.

Last year it announced a method of linking four of its Prime microcomputer systems to 23m bytes of disc storage. It has developed systems for linking its minis and micros to mainframes.

ABS Computers, a small but fast-growing manufacturer which is now part of the Tratalgar House group, looks ready to make more impact on the market. It is very much a user orientated company with a special line in easy to use software.

But one of the UK's most successful computer manufacturers is Redifusion Computers which last year launched its "System Alpha" - which Mr Mike Aldrich, its managing director, calls a "teleputer" - an all-purpose business tool. It has all the facilities of a computer terminal, videodata colour television, interactive video system and personal computer.

The list is not exhaustive but it gives the flavour of British computers; the silver lining to ICL's troubles is that it gives these companies a place in the sun.

### New series

If the Sinclair machines, now being built at an estimated 500,000 a year, have kindled the spark, the BBC is hoping to fan the flames of popular computing with its instructional series, due to start next month.

The BBC computer has been designed by ACORN, whose managing director Mr Chris Curry pioneered low price microcomputing in this country four years ago with a single board minimum specification device called the Science of Cambridge Mark 14. Priced at less than £40, users built it themselves with all the fun of finding the wrong parts in the little plastic bags Science sent out. Thousands were sold.

The BBC machine looks very good value for money. Ironically enough, production is delayed because of problems with the very chips - uncommitted logic arrays from Ferranti - which spelled success for the ZX81.

At the top end of the micro-computer spectrum, there are a small number of UK manufacturers developing high quality systems for professionals.

It is significant that when Mr Rob Wilmot, ICL's new managing director, was looking for suitable small systems to market, he should look first to the U.S., for the high quality graphics provided by a micro-computer from Three Rivers Corporation, and then to the UK for a machine called the Black Box built by RAIR.

The RAIR microcomputer has a high reputation among programmers as an easy-to-use machine and is regarded as an excellent choice as a business micro.

Research Machines of Oxford build a machine called the

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The list is not exhaustive but it gives the flavour of British computers; the silver lining to ICL's troubles is that it gives these companies a place in the sun.

### THIS YEAR'S 'WHICH COMPUTE R?' SHOW

## 30,000 visitors expected

THE WHICH Computer Show, which opens tomorrow at the National Exhibition Centre, near Birmingham, is expected to attract around 30,000 business executives looking for word processing and computing equipment, software applications packages, consultancy, bureau and ancillary services.

The event, being held in Hall Four at the NEC from January 19 to 22, has been expanded by 60 per cent compared to last year's show. More than 75 per cent of this year's space has been booked by exhibitors at the

first show.

Among more than 220 exhibitors are such leading companies as IBM, Rank Xerox and ICL, plus the newer household names such as Tandy, Apple and Commodore.

Research among the 1980 show's 24,000 visitors revealed that nearly half the audiences came from small establishments employing under 100 employees and that 28 per cent of visitors were directors or consultants. Nearly 40 per cent expected to purchase within the next year, and 78 per cent indicated the purchasing decision.

Two new features of the show are controlled by two leading professional bodies. The National Computing Centre is managing a consultancy and information service to help visitors size their requirements, while the Computing Services Association's C&A City will house companies providing software and business facilities. This new emphasis on software reflects the changing costs of computing, in which software now tends to form the major element of any computing investment.

# Tandy TRS-80 MICROCOMPUTERS

The Biggest Name in Little Computers For Business, Educational and Personal Applications

## The Incomplete Records System

# £3266.90

- Accepts All Nominal Transactions
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Designed by accountants, for accountants, this system has been primarily designed to help you with the accurate entering of transactions into ledgers, to remove the need for you ever again to look for differences in the trial balance and to produce automatically the statutory schedules for accounts, including a VAT statement by analysing the ledgers for you. Essential requirements are 48K Model III Twin Disk System plus Line Printer VI (as illustrated).



Model III with Twin Disk Drives  
**£1799**

TRS-80 Line Printer VI  
**£649**

TRS-80 Model III Micro-computer - as with the above system - virtually all Model I software is compatible. Has 12" high-resolution monitor.  
26-1066

Low-profile full 132 column printer with built-in self-test. Uses 4" to 14 1/2" fanfold or single sheet paper. Removable adjustable forms tractor included.  
26-1166

Incomplete Records Package  
**£599**

TRS-80 Systems Desk  
**£189.95**

Suitable for sole traders, partnerships and limited companies or non trading organisations. Account titles are changeable.  
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A functional place for your TRS-80 Model III micro-computer, measures 1200mm x 700mm x 700mm. With optional additional lockable drawer.  
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TRS-80 Equipment may be purchased or ordered at any TANDY store or authorised dealer.

OVER 270 STORES AND DEALERSHIPS NATIONWIDE Known as Radio Shack in the USA  
Check your phone book for the Tandy Store or Dealer nearest you Prices may vary at individual stores. Offers subject to availability.

COMPUTERS XI

Guy de Jonquieres asks Robb Wilmot, managing director of Britain's biggest computer group, about his new strategy

Why ICL's deal had to be with Fujitsu

G. de J.: ICL has staked its future as a mainframe computer supplier on its collaboration with Fujitsu of Japan. Did you ever consider a similar arrangement with a European or a U.S. company?

R.W.: The collaboration with Fujitsu gives us access to their very large scale integrated circuit chips, primarily those that are intended for use in mainframes. ICL is the only major developer of mainframes in Europe, and none of the chip suppliers in Europe is actively developing chips uniquely for mainframes. So really, it is not practical to seek a collaboration in Europe because the technology does not exist.

G. de J.: What about collaboration with U.S. companies?

R.W.: It's very difficult. The key thing that we want is chip technology. We are not ceasing to design and develop mainframes. It is my view that

Fujitsu has very much superior chip technology than any of the American companies who are also in the mainframe business.

G. de J.: Some commentators have suggested that Fujitsu may simply use ICL as a stepping stone to give it a head start in an inevitable Japanese assault on European computer markets. How do you plan to safeguard against that risk?

R.W.: I know this is a concern that people have, but let me reiterate that the collaboration with Fujitsu is for use of their chips. ICL has always bought-in chips. Our collaboration with Fujitsu simply accelerates the point in time at which we gain access to a new chip technology compared to a normal course.

cial user. It therefore allows our own developers to produce state of the art computers earlier than they otherwise would. This strengthens, not weakens, ICL's position.

G. de J.: Did Fujitsu insist that you market their very large computers in exchange for giving you access to their chip technology?

R.W.: Yes, it is part of the arrangement. However, it is a very different market place, which ICL does not have the ability to penetrate itself. We are talking of data-processing centres five to 10 times larger than the largest ICL installations. It is a market where Fujitsu have achieved very outstanding performance levels.

G. de J.: The European computer market has been dominated for years by American companies. What are the prospects for European companies reversing that situation?

R.W.: I think that in the smaller computer area where a lot of the growth is—minicomputers, microcomputers, office systems and telecommunications products—we have already seen a much more significant penetration by the European manufacturers than has historically been the case in mainframes.

You have only got to look at manufacturers like Olivetti and Nixdorf to see very viable companies in the small systems market that are not only performing well in Europe but are performing well in the U.S. and many other countries.

G. de J.: ICL's recovery strategy includes no collaborative links with any other European companies outside Britain. Why is that? Do you see any realistic prospects for cross-frontier collaboration between European companies in the future?

R.W.: We already have fairly extensive relationships with other European computer companies through the various standards organisations. As we move into the era when computing and data communications and telecommunications merge, I think you will see that standards take on a very much more significant role than in the past. Most large organisations are only just beginning to implement networks of computers, meaning that machines have to be able to talk to each other.

As we move into the next year or two, I think that there will be a growing understanding that standardisation of networking standards is going to be a crucial issue.

G. de J.: There may be agreements on technical standards, but regulations imposed by different countries, particularly by national telecommunications authorities, still differ widely. Will that not pose an obstacle to the growth of the networked computer systems which you envisage in the future?



6 We need major investment in computerisation of data bases

R.W.: Well, of course, the immediate growth is within national boundaries. With communications and computing technology converging into information technology, I think there is a strong probability that you will see the telecom standard-setting and computer standard-setting bodies coming very much closer together in the coming year and even merging over the relevant standards.

That does not mean that there won't be political overtones and genuine concerns about the free ownership and transmission of data. But I think that these will tend to get resolved because the ability to communicate freely within the Common Market is, I think, going to take on a very high profile.

G. de J.: Do you see collaboration with other European companies remaining essentially in the field of technical standards, or could it develop into closer industrial co-operation?

R.W.: I think standards will be the basis. There are potential areas for commercial relationships where one com-

pany could take a particular product where it has unique skills and develop it for both parties, and the other company could do similar work in a different area.

My own view is that this is likely to build up around information technology products, particularly office products, where no one European computer company has got the complete spectrum of skills.

At the end of the day I think you have got to be pragmatic and accept that each of the major European countries wants a viable and vital computer industry of its own. Whatever co-operation may emerge in Europe, I don't think you will ever eliminate the desire by the French for a French computer industry. Same thing in Italy, same thing in Germany, same thing in the UK. Which isn't bad. I think one has to accept that that's life and not attempt to devise any grand plan which assumes that one can somehow overcome it.

Therefore, you have got to find lower-level relationships which are pragmatic in their nature. The Airbus is a good example. Bits and pieces of it were built all over the place, but it was not a Concorde. It worked, whereas the grand plan has not yet been shown to work—ever.

G. de J.: The previous management of ICL complained loudly that the company suffered because foreign Governments gave more support to their national computer industries than ICL received. Is that still true?

R.W.: Yes, it is.

G. de J.: How much of a handicap is it?

R.W.: I think that any Government support is a mixed blessing. We do not go around with our begging bowl. Our job is to take the money that we spend—which is significant, as we spend £75m a year on research and development—and spend it more wisely and effectively. We have a lot of work to do in that area, as well as lobbying for more enlightened procurement.

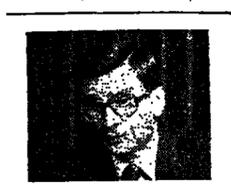
It is our feeling that rather than subsidies for development, it would be far more effective to see a higher level of investment by Government in information technology. At the end of the day, the nature of the Government's business is largely

administrative. Information technology can improve the productivity of the administrative process tremendously.

G. de J.: What do you mean by enlightened procurement?

R.W.: One of the problems with the way that cash limits are applied in this country is that it is very easy to cut back on capital investment, which is the seedcorn of productivity improvement and improved services in the future. I think that this has happened in many Government departments. What we would like to see is the information technology capital budget separated from the rest of the cash limits.

G. de J.: What sort of projects would you like to see the money channelled into?



6 One has just got to take a very aggressive approach

R.W.: We would like to see major investments in the computerisation of data bases. In many sectors of Government data are still held on card filing systems. The rest of the world has moved through one generation of computers and is now moving into the second generation of data bases, which are very sophisticated electronic filing systems.

G. de J.: Since the GATT and EEC rules on central government computer procurement were changed at the start of this year to end preferential procurement policies, there would be on guarantee that ICL would win these contracts.

R.W.: That's right.

G. de J.: So the measures which you are advocating could turn out to benefit IBM, say.

R.W.: As long as we all

benefit, I don't mind. The Government is a very large part of the total economy. If it is not aggressively investing in information technology for its own use, it must be a depressant on the whole industry. I don't think we are suggesting that enlightened procurement means just buying ICL computers. It means a very much higher level of investment in all potential suppliers.

G. de J.: What order of investment would be appropriate?

R.W.: The way we try to measure it is to look at the total number of video terminals in use as a percentage of the total workforce. In the UK we have a level of about one-third of that in the U.S.

Let's say we wanted to triple the number of terminals to bring us up to the same level as the U.S. That would mean putting in four or five million terminals at £1,000 each—£4bn in total. That's just for the terminals, and each of those would have to be backed up by an equivalent amount of computer power, or more. That is total, for both private sector and government sector. So if you halve it, the investment for government is probably £4bn or £5bn.

You can't do that quickly, and the worst thing you can do is to try to catch up four years in six months because you will fall all over the place. But certainly a phased plan of two to three years to catch up and intercept the U.S. could produce very meaningful results because the savings can be tremendous.

Look at the way a lot of the Government's administration is run. National Savings is still uncomputerised, the Health Service is and hospital administration is all manual. The regional administration in hospitals is computerised but it is not on line. All the records have to be sent off on bits of paper and entered on key punches.

Look at the Post Office. . . look at a Post Office counter, what do you see? Weighing machines. Go to Japan, for example, and the whole thing is on electronic on-line banking. Instant withdrawal, instant paying-in. Electronic monitoring of the passbooks, mechanical printing, magnetic coding of the passbooks.



Robb Wilmot: superior chip technology led ICL to Fujitsu

One has just got to take a very aggressive approach. It is a malaise of British industry that capital is considered something to be saved, not spent. I take the exact opposite view, that capital is something you want to find ways to spend.

G. de J.: You have said that you intend to turn ICL into a genuine multinational. What is your strategy for selling in the U.S. and Japan?

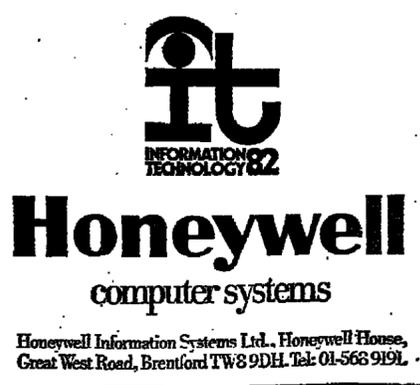
R.W.: In the U.S. we've traded at a loss in the past, and our

first job is to correct that and trade profitably. We're close to doing that now. The second major thrust will be on the basis of a new micro which we will start producing early next year. From what I've seen in the U.S., it will get very wide acceptance.

We're also hoping to take our Distributed Mainframe, which is scheduled for late 1984, into the States in a big way, probably through American systems and software houses. We haven't really got around to thinking about Japan yet.

The right one for the job.

1982 is the year of Information Technology. It is the ideal opportunity for an exciting business to communicate to everyone its ambitions and achievements on a scale that has never been possible before. In particular, it will stimulate the interest of existing computer users and first-time purchasers alike. We welcome this opportunity. Not every computer manufacturer can offer systems and software for organisations in all walks of life. Not every computer manufacturer can call on worldwide resources and long experience of information organisation. Honeywell can do all these things. Which is why, in this most important of years for information technology, Honeywell must be the right one for the job.



COMPUTERS XII

Terry Dodsworth looks at Mitterrand's plans to reduce U.S. control of the industry in France

Saint Gobain rides to the rescue

THE TOP 25 COMPUTER COMPANIES OPERATING IN EUROPE

Data processing (DP) revenues in \$m for year 1980. This table does not include Philips, for which figures are not available.

Table with 12 columns: Rank, 1980 Company, Parent company HQ, European DP rev. 1979-80, % change European DP rev. 1979-80, DP rev. domestic (parent company), DP rev. worldwide, Total rev. Europe worldwide, Total rev. worldwide, % change total net income 1979-80, Total net income worldwide, % change total net income worldwide employees, Total employees, Year ending.

\* Not available. † Figures include word processing. ‡ Profit before tax, not net income. § Estimates. ¶ 1979 results.

Source: Datamation/Logica

THE ARRIVAL of a Socialist Government in France is bringing with it yet another reorganisation of the computer industry.

The restructuring of Cii Honeywell Bull, the only nationally-owned large mainframe computer manufacturer, is partly due to the Socialist doctrine that strategic industries should be brought into State hands.

Efforts to create an independent and internationally competitive French computer group go back about 20 years. At that time, General de Gaulle was stung into setting up the embryo of the modern-day Cii when the Americans refused to sell his Government a large computer necessary for work on the nuclear defence programme.

Despite hefty subsidies, however, Cii never managed to establish itself fully. In 1976, it was merged with the American-owned Honeywell Bull in a deal which gave Honeywell a 47 per cent stake in the French group.

What the new Government is now trying to do is to annul, or at least reduce, this reversion to American control.

Because Cii is heavily dependent on American technology, the most likely result of the talks now going on is a trimming back in Honeywell's stake to about 20 per cent in what will then be a nationalised concern. The negotiations with the U.S. group, however, have also coincided with profound changes in the French management which would in any case have altered Cii to some extent.

Objectives

These changes derive from the acquisition of the French shares in Cii by Saint Gobain, the big glass-making and steel pipe conglomerate, which is also being nationalised. Saint Gobain's entry into Cii preceded the Socialist victory in the elections last summer and was largely inspired by its need to diversify out of relatively stagnant manufacturing sectors. But it has immediately shown itself to be a more vigorous partner in Cii than CGE, the previous owner of the French shares, which had steadily lost interest in further investment in the computer industry.

Saint Gobain's objectives clearly coincide with many of those of the new Government. The glass-making group has, for the past two years, been in the process of constructing a widely based high-technology division through a series of takeovers and participation deals. It has established a microchip company in a joint venture with National Semiconductor of the U.S., moved in on Cii, and also taken a 30 per cent stake in Olivetti, the Italian typewriter and office equipment group.

More recently, in collaboration with Olivetti France, Saint Gobain gained control of Logabax, one of the larger French mini-computer manufacturers, which ran into deep financial

trouble in 1980. This acquisition clearly illustrated Saint Gobain's intentions of establishing a computer-based group with a range of activities that give wide market coverage.

It also indicated that Cii is seen as one building block in this structure, dedicated essentially to a rival plan by Cii itself to move in on Logabax was quashed by its parent company, and eventually led to the forced resignation of M Jean-Pierre Brule, its managing director.

These manoeuvres by Saint Gobain and the new Government, however, have yet to prove that they can give France a viable computer industry. Cii, having gobbled up subsidies of FF1.2bn since 1976, and making a slight FF1.16bn profit in 1980, is expected to lose between FF1.300m and FF1.400m for the 1981 financial year.

Even if the Honeywell negotiations are successfully concluded, it will remain strongly dependent on the American group for at least half of its technology, since a significant

proportion of Cii's sales is of American-made computers for which it has no immediate substitute. At the same time, Saint Gobain has to show that it can set Logabax on its feet again, while making the link with Olivetti work.

All of this reorganisation is being done, as 20 years ago, in the shadow of IBM, which remains the dominant force in the French market. The American group, which has manufacturing plants in France (ironically, it has lower imports from the U.S. than Cii), is reckoned to have captured about 33 per cent of the total French market for large and small machines. This is about twice as much as Cii, on about 17 per cent, despite the fact that the French Government has guaranteed Government sales.

IBM, in particular, dominates the big mainframe market, which accounts for the largest element in the industry's sales. Its 70 per cent stake completely dwarfs the position of its main rivals, another three American producers — Univac, Control Data and Burroughs. But even

in the middle range sector, where Cii is at its strongest on about 37 per cent, IBM leads with 40 per cent of sales. ICL of the UK has about 3 per cent in this category.

French manufacturers have been hardly more successful in ensuring that the country's independence is in most other sectors of the market. The small computer and peripherals industry, for example, has been hit by the collapse of Logabax. While other French manufacturers, such as CIT-Alcatel, Sagem and Electronique Marcel Dassault are now developing quickly — partly as a result of a FF1.68bn Government-backed aid plan — foreign competition remains fierce. Olivetti, for example, has a prominent position in this sector.

The strong point of the French industry is in software, where France has created some of the leading European companies, such as Cap Gemini-Sogefi and GSI, a subsidiary of the CGE electrical group. But much of the current expansion of the big French groups in this

field now seems to be going into the field of automated office equipment, where the application of computer-based systems presents big opportunities for growth.

This part of the market in France is reckoned to be underdeveloped compared with other industrialised countries such as the U.S. or West Germany. It is also under-supplied by French manufacturers, who have allowed importers to capture at least 50 per cent of sales without building up compensating exports: the trade deficit was calculated a year ago at about FF1.5bn, and could grow further because of the rapid 20 per cent to 40 per cent expansion in the domestic industry.

More aid

The past French Government began efforts to try to coordinate a response to this weakness in the industry by pumping in aid tied to specific contracts. CIT-Alcatel, the CGE subsidiary, is in particular said to have benefited from these schemes. But the two most important developments have been the attempts by two of the industry's largest groups, CIT-Alcatel and Saint Gobain, to

achieve a new international dimension to face up to the challenge that is coming from multinationals like Xerox, Burroughs, Triumph-Adler, Philips, and so on.

CIT, for example, has taken over Roney, Vickers of the UK in an attempt both to expand its product line and develop its international sales network. Saint Gobain's link with Olivetti was conceived in a similar manner as a means of building bridges between the group's computer technology in the Cii affiliate and the office equipment applications in Olivetti.

Thus, in both the established mainframe computer sector and the fast-developing office equipment applications, Saint Gobain holds many of the most important cards for the future of the French industry.

Its sudden move into this high technology sector has been conceived on an ambitious scale designed to give France a strong position at home and the base for healthy exports. But until the talks with Honeywell are concluded, and the new organisation of the company settled into place after nationalisation, it will not be clear exactly how the company intends to proceed under its new state owners.

Stewart Fleming analyses recent upheavals

Germany sees growth in data processing

THE BOOM in sales of data processing equipment in West Germany began to run out of steam last year as the weakness in the economy finally began to make itself felt in decisions by companies to cut back or postpone capital spending.

In the past the data processing industry in Germany has been able to buck the overall economic trend and has been accustomed to steady double digit growth rates. But after a strong first quarter with sales up around one fifth, the second and third quarter performance was flat, and industry forecasters were concluding that for the year as a whole the DM 40bn (\$9.3bn) a year data processing industry would show little or no growth overall, even though individual sectors were

The main factor behind the weakening demand was the performance of the economy. In 1980 capital investment in German industry had held up well as economic growth slowed. But in 1981 as companies began to suffer what, according to the Bundesbank, the West German central bank, has been the worst slump in corporate profits in the post-war period, companies began to cut back investment spending. Surging interest rates, which hit record levels during the course of the year and made long-term finance either unavailable or prohibitively expensive, were another factor in decisions to trim investment spending. Above all medium-sized companies, which have been a strong market for data processing equipment, have been particularly hard hit.

The industry's problems in the past year have not been the result only of weakening demand, however. Aggressive price competition, above all from International Business Machines which dominates the market with an estimated 55 per cent share, has added to the pressures on profitability. What has also become clear, however, over the past 12 months that some of West Germany's leaders in the data processing and

office equipment sectors of the industry have been slow to respond to the pace of change in the market place.

Perhaps the most dramatic example of the problems this has created was provided by the grim news from Triumph-Adler, the office equipment subsidiary of motor manufacturer Volkswagen. Volkswagen lavished an estimated DM 1bn on the acquisition of Triumph-Adler, beginning in 1979, a diversification move which was seen as opening up a new growth market for the motor group.

Heavy losses

In early September, however, came the news that the company was facing heavy losses for the year and was examining a drastic re-organisation programme which would cut its workforce by a third and involve the closure of its second largest German plant, the Adler works in Frankfurt.

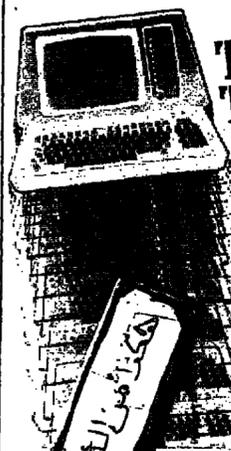
In the event the company was forced by union and political pressure to trim back its re-organisation plans, but the message was that the company now considered significant parts of its product line to have been overtaken by technological change, and that too many of its products were still concentrated in the electro-mechanical equipment market. Olympia Werke, the AEG-Telefunken subsidiary is another former typewriter manufacturer which, like Triumph-Adler, has recognised that it, too, must accelerate its plans for phasing out products which advancing technology has made obsolete.

Siemens, the leading German computer company with a 20 per cent market share, has also felt the need to shake up the management and structure of its data processing operations. Thus earlier last year the main board member responsible for its data processing operations had to step aside, and the small business computer

segment of its data processing industry was split between the communications division and the power engineering division.

The changes led to speculation that Siemens might be cutting back its computer operations, something which Siemens has roundly denied. On the contrary the company has pointed out that its research and development spending in the computer business is currently running at DM500m a year, and the company sees itself as being very firmly placed to carve out a strong position in the market for equipment for the offices of the future.

It is this sector of the data processing market which is expected to be the fastest growing in coming years, and Siemens is not alone in its efforts to prepare to take advantage of the opportunities presented by the convergence of telecommunications and data processing technology.



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COMPUTERS

Argus in control

The North Sea offshore oil industry is now a major user of computers. Ferranti Argus computer control has been chosen for use in the Forties, Brent, Ninian, Thistle, Murchison, Hutton and Fulmar fields. Ferranti expertise has won the company orders for similar systems abroad including the Rhine-Rotterdam pipeline, the BP Rotterdam refinery and the Shell BP oil and gas production installations in Nigeria. The British Steel Corporation has ordered process monitoring systems for the Queen Anne blast furnace at Scun-

thorpe and the basic oxygen steelmaking plant at Lakenby. Orders for the electricity supply industry include computers and displays for the CEGB's North East and South West regional grid control centres and a monitoring system for Fiddler's Ferry power station. From Germany important orders include the control system for an ethylene plant being built by Linde in Portugal and seven Argus systems for Briggitta and Elverath, a company owned jointly by Deutsche Shell AG and Esso AG.

TRANSPORT

Travel computerised

The British Airways BABS reservation system has been extended to include Ferranti terminals in seven Japanese cities. An automated check-in service using Argus computers is working at Hong Kong and Manchester Airports. Ferranti intelligent terminals have also been installed by British Airways for their Workshop control system.

In the field of road traffic control several Ferranti dual computer systems have been installed including those at Nottingham, Coventry, Cardiff, Leeds and Manchester.

The good news is FERRANTI Selling technology

NEWS REVIEW

BUSINESS Ferranti first in computers

The computer activities of Ferranti date from 26th October 1948, when the first order for a UK-built computer was placed. In recent times Ferranti Computer Systems Ltd has put most emphasis on real-time on-line systems for civil and defence applications taking responsibility for system design, manufacturing, programming and setting-to-work. 'New technology' The Ferranti CS7 computer-assisted composing system is now well established. Users include the Printing Industries Research Association, the Observer newspaper, Odhams and Her Majesty's Stationery Office (for the production of Hansard).

Briefly... Ferranti Computer Assisted Command System (CACs) will be fitted in a variety of naval ships during the 1980s.

Computerised Message Switching Systems from Ferranti are in use in three centres in Australia, at Heathrow Airport and at the Meteorological Office.

Ferranti computerised command and control systems are operating with several UK police forces and a resource mobilisation system with the Greater Manchester Fire Brigade (the first of its kind).



Computer systems undergoing final tests at Olivetti's Scarmagno plant, near Turin. In Europe, Olivetti has a strong market position, particularly in Britain, West Germany, the Benelux countries, as well as Italy. Outside Europe, Olivetti is winning good sales in Latin America, the Far East and Australia

James Buxton examines operations by Olivetti and IBM Italy

# Italy is European leader in use of small and large models

THERE ARE only two significant companies in the Italian computer manufacturing industry: Olivetti, the biggest company in Europe and the sixth biggest in the world as a producer of information processing equipment and office products; and IBM Italy, which has the distinction of being the country's most profitable company (among those which publish accounts).

The Italian computer market reflects the dominance of the two companies. By European standards it has the highest proportion of small computers in operation and the highest proportion of large ones, while the proportion of medium-sized machines is below the average. Olivetti is almost exclusively in the field of small business computers and distributed data processing, while IBM concentrates on large computers. Olivetti's data processing business accounted for nearly 80 per cent of its turnover in the first half of 1981.

While IBM Italy is a significant exporter, exporting about a third of its output, Olivetti is an international group only 35 per cent of whose sales are made in Italy. It has been enjoying a period of fast-rising sales and improving profitability ever since the arrival in 1978 of Sig Carlo De Benedetti as chief executive and a leading shareholder. Because it is involved in both office automation and information processing it is better placed than some of its rivals for the coming battle to produce electronic office equipment.

### Financial crisis

Olivetti, which began as a typewriter manufacturer at Ivrea in Piedmont in 1908, started to manufacture computers in the late 1950s. But in 1964 the combination of a financial crisis for the company and lack of Italian Government support for its computers—in the form of substantial orders—forced it to withdraw from the mainframe business.

But it stayed in the field of data processing and in 1965 produced the first scientific desk-top microcomputer. From then on it concentrated on using its experience in mainframe computers to make electronic desk-top equipment, thus bridging the gap between its office machinery and large computers.

It was also able to build on its experience in accounting machines which functioned as terminals for large computers—for use in banks, etc.—and was one of the first companies to produce electro-mechanical terminals. By 1975-76 it was producing an electronic version, which comes under the category of a distributed data processing device, linked to a large computer. Throughout the 1970s it strengthened its position in these fields so that it now produces a complete range both of small business computers and of distributed data processing devices.

In terms of hardware there is little difference between the two—the difference is in the software. An example of distributed data processing are Olivetti's systems for use in banks, in which it has traditionally been strong. It won a large order from the automation of a network of Danish savings banks in 1980 and two for British buildings societies in 1981. Recently, it beat Japanese competition to modernise the Nkyo network of Japanese savings banks, a client which Olivetti has been serving for 10 years. Olivetti claims that about 75 per cent of Italian banks have Olivetti terminals.

In 1980, Olivetti's business system—business computers—made up 23 per cent of sales, and terminal and data entry systems a further 16 per cent. The company has a strong position in Britain, West Germany, and the Benelux countries, as well as Italy. Sales in Europe made up 70 per cent of total group sales. Outside Europe, Olivetti has a strong position in Latin America (12 per cent of all sales) and a useful presence in the Far East and Australia (11 per cent).

Its main disappointment has been the U.S. market in which it has failed to make money for most of the past 20 years. Olivetti's involvement there has been mainly in the form of office products such as typewriters. Tackling such a large market that is on the door step of the big U.S. information processing equipment makers has proved difficult. U.S. sales in 1980 made up 7.5 per cent of the total.

Now Olivetti is using a new approach to the U.S. market. In 1980 it took a stake in a U.S. data processing company named Docstel which manufactures automatic teller machines. Olivetti is now selling to the U.S. market through Docstel. An important reason for Olivetti's stake in Docstel, as well as that in Syntrex, a small U.S. company which makes word processors, is that they enable Olivetti quickly to gain new technological knowhow which it does not always have the capacity to produce itself. The whole business is changing so fast that the loss of a year's research and development work can be disastrous to a company's financial position.

### New products

"I keep telling my colleagues: we have to earn our living every single day," says Sig Vittorio Levi, director of Olivetti's information processing and office automation division. Olivetti products are constantly being superseded by their more efficient, usually smaller successors, and its factories are in a constant process of change as new products are introduced and working methods changed.

In terms of sales growth, the company's biggest success at present is its range of electronic typewriters, which it was the first company to bring out. It is on this product more than any single other that the turnaround in the company's fortunes under Sig de Benedetti has been based.

In the first half of 1981 they made up 20 per cent of turnover, compared to 8 per cent in the first half of 1980. The most sophisticated model can do text revision and other processing operations previously confined to more sophisticated work word processing systems.

The electronic typewriter does not come under the heading of computers. But it does show the way in which Olivetti's products from the business systems to cash registers, are gradually converging into a set of electronic products with increasingly similar components and functions. The next step will be the electronic office, almost homogenising today's computers, office equipment and telecommunications devices.

Olivetti's involvement in both office equipment and computers gives it an advantage over some of the other European office equipment makers like Olympia. But as the hardware of the future becomes more similar it will face competition from companies from other fields like telecommunications which have not previously been involved in office automation. This is why Olivetti is anxious to expand further into telecommunications.

To complete its offerings in the range of computer products Olivetti returned in 1980 to selling mainframe computers under licence. The computers are made by Hitachi of Japan and by IPL, a U.S. company in which Olivetti has a 33 per cent stake. Last year Olivetti sold 51 machines, the majority of them in Italy and is now able to offer its clients a full range of compatible computerised equipment.

This is a small operation compared with the performance of IBM and the other U.S. and Japanese mainframe computer manufacturers. IBM Italy alone had sales in 1980 of L1,422bn (£648m), compared with the turnover of the whole Olivetti group (only 35 per cent of which was in Italy) of L1,102bn, on which it made a profit of L50bn. IBM Italy made net profits of L175bn.

William Dullforce on growth in financial terminal systems

# Nordic states mount a challenge

AS ADVANCED technical societies with extended welfare administrations, the four Nordic countries—Denmark, Finland, Norway and Sweden—have been quick to adapt to the use of computers. They offer a relatively small but sophisticated market in which selling successes are prized by major world producers.

On the manufacturing side, the efforts of a few Nordic companies to build and market general purpose computers failed. Now, however, with the expansion of office and factory automation and of personal computing some Nordic concerns making smaller systems have started to grow fast.

In one field, financial terminal systems, the Nordic market is particularly advanced. Helped by a tradition of co-operation and spurred by the need to curb costs in high-wage societies, the Nordic banks have developed large computer-linked networks of teller terminals, which they have steadily upgraded.

The banks, too, have taken the lead in introducing electronic debt systems at the retail shop level, under which shop customers pay for goods with a card which immediately debits their accounts. A system planned by the Danish banks has run into some hitches with the bank employees' union and politicians but is expected to be realised soon.

In the international context, one of the most interesting recent developments from the Nordic area is the attempt by L. M. Ericsson, the Swedish telecommunications group, to exploit its knowhow in computerised communications to carve out a share of the business systems market.

Ericsson has just acquired Datasab, the loss-making Swedish computer and terminal producers which is the remnant of the Swedes' earlier efforts to break into the world computer market. From January, L. Datasab will be incorporated in a new Ericsson Information

Systems, which will operate four divisions.

In the U.S., Ericsson has gone into a joint venture, Anaconda-Ericsson, with Atlantic Richfield, which will be offering Ericsson's new digital PAX system to the American market and will be a springboard for entry into the office equipment sector.

### Shipments

Statistics on the Nordic computer markets are not easily compiled because of the varying definitions and demarcations used, but in 1980 Quantum Science Corporation assessed 1979 shipments of general purpose computers to the Nordic market at \$338m. It put sales of small business systems at dollars 194m and of terminals at \$290m.

These figures would give the Nordic countries about 4 per cent of the overall Western European market for general

purpose computers, 6.5 per cent of small business systems (including personal computers), and 9 per cent of terminals.

Most significantly, Quantum Science Corp. foresaw a 23 per cent annual growth in sales of small business systems in the Nordic area in the five-year period to 1984, compared with 13 per cent for general purpose computers and 12 per cent for terminals.

Sweden accounted for over 40 per cent of the installed capacity in general purpose computers, for some 37 per cent of the small business systems and about half the terminals. The Swedish Office and Computer Equipment Suppliers Association reported an increase of about 20 per cent in its members' sales during 1980. It estimated that sales of general purpose computers were rising at an annual level of 5-10 per cent while small computer sales were going ahead at between 20 and 30 per cent a year.

CONTINUED ON NEXT PAGE

# "Why do I have to wait for the figures I need?"

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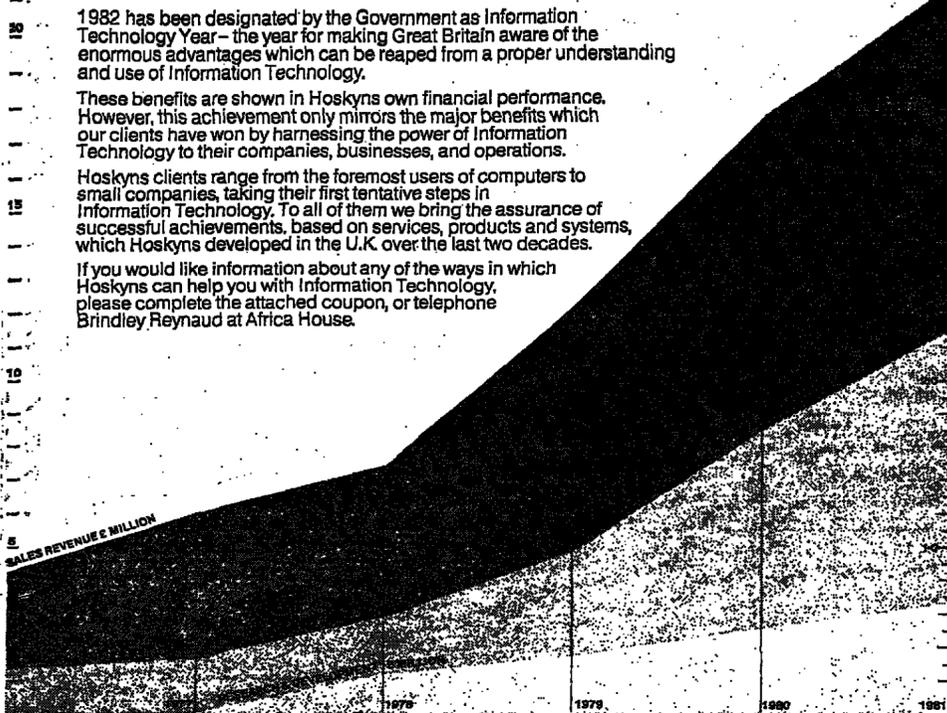


1982 has been designated by the Government as Information Technology Year - the year for making Great Britain aware of the enormous advantages which can be reaped from a proper understanding and use of Information Technology.

These benefits are shown in Hoskyns own financial performance. However, this achievement only mirrors the major benefits which our clients have won by harnessing the power of Information Technology to their companies, businesses, and operations.

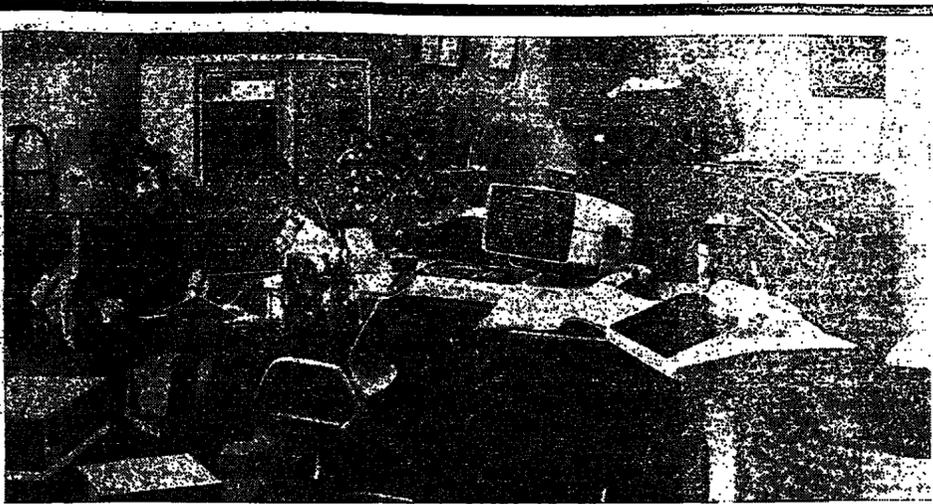
Hoskyns clients range from the foremost users of computers to small companies, taking their first tentative steps in Information Technology. To all of them we bring the assurance of successful achievements, based on services, products and systems, which Hoskyns developed in the U.K. over the last two decades.

If you would like information about any of the ways in which Hoskyns can help you with Information Technology, please complete the attached coupon, or telephone Brindley Reynaud at Africa House.



The table below is a grid of some major sectors covered by Hoskyns Modular Application Systems and other associated systems. The diagonal of the sectors and computer's type is shown. You may return this coupon.

Independent financial unit	Commercial Sector	Consumer	Medical	Education	Manufacturing	Transportation	Government	Healthcare	Research	Defense
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Banking										
Business										
Control										
Finance										
General Business Systems										
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Data General's Nova Four computer has useful applications for commercial environments that require both scientific functions, such as route-planning and schedule analysis, and traditional inventory control and accounting functions

# Localised data networks are the minicomputer's latest offspring Rapid communication within office or factory

TOWARDS THE end of last year, Computer and Systems Engineering (Case), a small (£12m turnover in 1980) but fast-growing British electronics company, offered 2.5m of its ordinary 20p shares for sale at 25p a share.

The offer was oversubscribed more than 30 times, reflecting the enlightened interest the City is showing in electronics shares these days. The success of the Case offering was further proof—if any was needed—of a new surge of enthusiasm for data communications, Case's speciality.

This enthusiasm has its origin in the possibilities for greater business efficiency offered through linking computers and terminals of a wide variety. It has been fanned by the evolution of the new silicon technologies which make possible efficient and reliable data communications at an economic price.

Until now, the major use of data communications has been in large, mainframe computer systems and the large computer networks needed to run airline reservation systems or electronic mail for international banks.

With the growth of the business minicomputer, all that is changing. Indeed, in the past months, there has been a flurry of interest in methods of transporting data at very high speeds over very short distances, typically within the confines of a single office block or factory site.

**Techniques**  
The key to the success of these local area networks, as the techniques used for this purpose have been dubbed, and other methods of commercial data communication, is reliability, maintainability and cost.

Data communications technology is, in general, well established. What is new is cheap communications devices that make it an economic proposition for a retailer operating a number of sales points to combine the information from all of them and send it along a telephone line to a central computer for consolidation at the most economically favourable time, or for a company to install television-like visual display terminals through which its executives can send each other memoranda whether or not the receiving station is manned.

The techniques of data communication, in fact, are all about reducing the cost of transmission. Transmission usually takes place over wires or cables, telephone or telegraph circuits, satellite links or—in special cases—advanced radio methods such as cellular radio. As Roger Evans, vice-president, marketing, for the fast growing U.S.-based communications company Micromer puts it: "Any computer system supporting multiple remote terminals does not have to be very large before the cost of the telephone lines and modems exceeds the cost of the computer and terminal equipment."

[A modem is simply an elec-

tronic translator which takes the electronic signals understood by a computer and converts them into the kind of signals which can be transmitted down a telephone line.]

Telephone lines are expensive and—with most systems—used for a large percentage of the time. The answer is to use concentrators or multiplexers, electronic devices which accept the information from several terminals and combine it in such a way that maximum use is made of the telephone network. Mr Evans gives as an example a U.S. company with a large scale nationwide data communications system.

"The system had grown, over the years, in an unplanned manner, responding to crises, using point-to-point telephone lines to service new locations as the demands of the organisation dictated. Before long it was using more than 100,000 miles of leased telephone lines."

"With the intelligent use of data multiplexers and concentrators, the line cost savings achieved were in excess of \$50,000 a month."

How is this achieved? Mr Peter Burton, managing director of Case, sees data communications divided naturally into two parts, transmission and transport.

Transmission he sees as the physical process of establishing data paths between the devices to be linked together—the telephone lines or satellite channels and their associated modems, together with the special monitoring equipment necessary to ensure that a network is performing to capacity.

Transport he defines as the technologies necessary to provide multiplexing and switching facilities. "A data transmission network consisting of telephone circuits and modems alone is expensive and inflexible. Because of the high cost of circuits, means must be found to allow several data links to share each of the circuits. Also, it is becoming increasingly necessary to provide a means of switching the data links to match users' needs just as telephone callers are switched to their destination by a telephone exchange."

Two of the most powerful techniques devised to solve these problems are "statistical multiplexing" and "packet switching."

The statistical multiplexer (or statmux as it is inelegantly called in the business) divides a data channel into two or more channels of lower average speed, dynamically allocating channel space according to demand in order to maximise data throughput at all times.

The statmux is a time division multiplexer; the streams of electronic pulses coming in from the terminals attached to the device are interleaved in a synchronised manner so that the receiving statmux knows from where each pulse has come and where it is to be sent. And it selects which of the available outgoing telephone lines can best handle the out-

going data stream at any one time.

Statistical multiplexers or concentrators are available from a range of companies including Olivetti, Burroughs, Case, Network Technology, Timeplex, Racal, IBM, IIT, Menzies Communications Services and Philips Data Systems.

The newest machines are cheap enough to be considered even by the first timer. Timeplex, a U.S. company with a leading position in multiplexing, pointed out in launching its E-series: "The lower tier market is characterised by users of small to medium sized minicomputers with remote, asynchronous (Stop-start) terminals. These users are new to multiplexing and overall cost rather than network sophistication is the determining factor in equipment selection."

"It costs £1,660 a year for a dedicated line of 50 miles, £4,500 a month for a line extending 300 miles and beyond. With the E-series multiplexer costing as little as £975, it pays for itself in a very short time."

**Switching**

Packet switching is another method by which information can be switched through a network and where information originating from more than one source can share the same circuit. The stream of electronic pulses is divided into groups or packets each with an agreed format, comprising identifier, address, message and tail, and released on to the network.

It is the job of the network computers to route the packets to their destination by the most cost effective route, taking into account line failures and so on.

Most European telecommunications administrations are now establishing national packet switched data networks. The impetus was provided by Euronet, a packet switched network set up to provide a means for scientists and technologists to gain access to the large computer-based data banks. Diane (Direct Information Access Network-Europe) is the EEC-sponsored information service that uses Euronet as its communication vehicle.

The world-wide banking network Swift is also a packet switched network. If, however, there is a need to transfer very large amounts of information very quickly from one place to another, one answer is the Tsdata Hyperchannel. This runs at the prodigious speed of 50 megabits a second—that is, 50m individual electronic pulses a second, or roughly fast enough to send 12 average novels from one point to another in one second.

The Hyperchannel is now available for IBM, Univac, Honeywell Modcomp, DEC, CDC, Burroughs, Tandem, Data General, Perkin Elmer and SEL equipment.

Data communications is just beginning its principal growth phase. No company making good datacomms products should have less than a full order book for the foreseeable future.

Note: data communications is

still a dark art to many, especially those brought up on conventional data processing. Case publishes and distributes an excellent introduction by Peter Burton, Pocket Book of Computer Communications, and Micromer has published notes from its introductory seminar Data Communications for Minicomputer Users by Roger Evans. Both are recommended. After that, it's back to the textbooks.

Alan Cane



T-Bar has combined the power of the microcomputer with easily-understood programme commands to execute line-access and switching functions. Above, the T-Bar Mass+ systems for accessing, monitoring and reconfiguration of on-line data communications networks

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Defence computers have to take the rough with the smooth. And it's mostly rough. Occasional weather, changing environments, driven hard and fast, the GEC 4000 is comprehensively ruggedised to cope through with flying colours. That's why Wavelet—the latest command and control system for the British Army—has GEC 4000 series computers for processing equipment. You'll also find GEC 4000 computers for mission system avionics flying high with the RAF in the Early Warning Nimrod.

**The GEC 4000 means business.**  
Designed for general purpose use, the GEC 4000 has been developed to meet operating requirements often hostile to computers, such as steel works and power stations. All GEC 4000 computers have upwards software compatibility. That means you're never left high and dry with one of our machines. Existing users can purchase more powerful computers in the range knowing their investment is secure in the future.

**The GEC 4000 communicates.**  
The power behind Prestel\* in eight countries, the GEC 4000 is the answer to viewdata system demands. Viewdata requires fast reliable responses to a large number of simultaneous users. That's the GEC 4000. It also requires the capability to run continuously for long periods without supervision. That's the GEC 4000 again.

**Scientific applications of the GEC 4000.**  
Rutherford Laboratory has twenty GEC 4080 computers with a spectrum of activity varying from particle acceleration experiments to laser applications. At the University of Liverpool, GEC 4000s are located in 11 departments, including the Chemistry Department, active computing facilities. At the Particle Research Centre, Chilton Laboratory for example, a dual-linked GEC 4080 system performs important functions related to the Laboratory's 4000 tons, 25 metered cyclotron.

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Memory capacity goes on increasing at a phenomenal rate. David Churchill traces how.

## COMPUTERS XVI

# Discs and cassettes lead the way

INFORMATION generated by computers has to be stored, otherwise much of the effectiveness of the technology is lost. Not surprisingly, therefore, the development of computer memory systems has gone hand in hand with the rapid strides in computer technology over the past few decades.

In the 1950s, when computers as we know them today were almost archaic in comparison, various systems were used to retain information. These methods ranged from punched paper tapes to electric vacuum tubes.

It soon became clear, however, that such systems were limited in their usefulness and so the industry turned to other forms of data storage. Magnetic-based memory systems soon became widespread and are still an important part of the data storage market today, although the growth of silicon chip technology has proved the fastest growth area.

The basic magnetic memories were magnetic core systems, consisting of tiny ring magnets threaded by control wires which magnetise and demagnetise them according to the pattern of "ones" and "zeros" which are to be stored. Over the past 10 years or so, the size of such magnetic core memories has shrunk considerably. But they still remain relatively bulky, slow and expensive and are now only used in a minority of storage applications.

**Thrust**

The main thrust of magnetic memory systems has been in drum tapes and disc systems. Drum storage, achieved with circular drums which revolve at very high speeds, are still used for large computing systems because they have very low error rates, although they are still relatively expensive.

However, with the miniaturisation of computer systems, has grown the popularity of both rigid and flexible disc storage systems. These discs, which are like a record with information stored magnetically, and scanned by moving recording heads, offer substantial storage of information.

In the mid 1960s, for example, a rigid disc could hold about 100,000 bytes to the square inch; now the storage capacity is over 7.5m bytes to the square inch and by 1990 this could rise to 100m bytes to the inch.

This considerably greater storage capacity has been achieved by cramming more bytes into each inch of line (the equivalent of the groove on a record) and by squeezing the lines closer together.

The disc systems are basically spread into two types, rigid and flexible. Rigid discs are aluminium discs coated with oxide and about 14 inches in diameter. There are about 40 or so companies that produce them, mainly in the U.S., and IBM is generally regarded as having the lead in the appropriate technology. The total market for rigid discs is well in excess of \$4bn a year according to market estimates.

The flexible—or "floppy"—discs are the expanding sector of the market. The discs are created by coating a flexible oxide onto a nylon disc. These have a much lower storage capacity than a rigid disc but are a fairly cheap and robust storage system.

Market estimates indicate that over 1m flexible discs are being sold a year and the market is growing rapidly. This demand has been helped by the growing market for word processing systems. Most word processors use small flexible discs just over 5 inches in size, compared with the "normal"

sized flexible disc of 8 inches. Within the next two to three years, according to market estimates, over half the 4m or so flexible discs sold world-wide could be mini-discs.

Apart from discs, one other important magnetic memory storage system is provided by tape cassette very similar in appearance to the cassettes used for conventional audio recording. The major difference, however, is in the electronics which control the flow of information to the computer. For the user of the home computer, or the small businessman with one of the very low-priced micro-computers, the ordinary cassette system will suffice until they can aspire to a floppy disc system at least.

The chief threat to the dominance of the magnetic disc systems will come from semiconductor memories which have developed in line with the phenomenal growth of silicon chip technology over the past decade. Such semiconductor memories had just under a fifth of the total memory market by the late 1970s, and are estimated to take nearly a quarter by the mid 1980s.

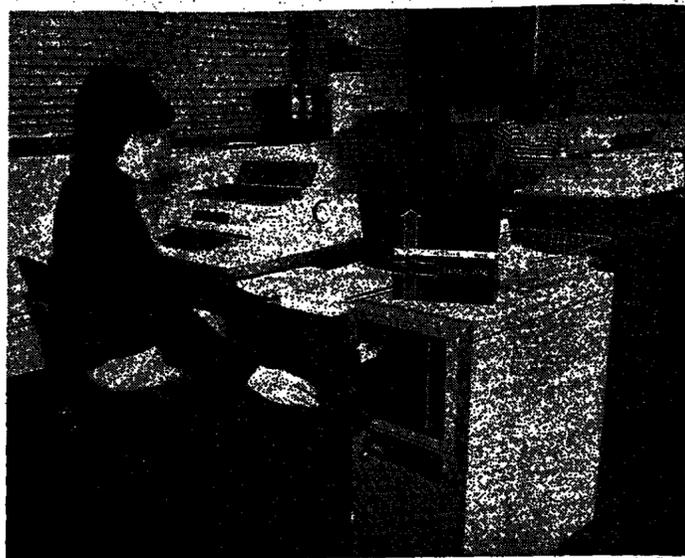
The growth in chip storage systems is shown by the fact that it was only a few years ago that the micro-electronics industry was halting as a significant achievement the ability to make chips with a storage capacity of just under 5,000 bytes. Nowadays, chips that can store over 65,000 bytes are commonplace.

There are a wide variety of semiconductor memories on the market, mainly from U.S. and Japanese manufacturers. Each particular memory system is usually geared to a specific computer application.

One of the largest sectors of the market are random access memories, which are broadly divided into two types—static and dynamic memories. Dynamic devices can be made more cheaply and have greater capacity than their static counterparts. However, dynamic memories have the disadvantage that they require special additional circuitry to ensure that information stored within them is not lost within a few seconds.

But, like all random access memories, there is the problem of retaining data when the power is switched off.

To counter this problem, manufacturers have developed "read-only memories" which do not lose information when



Staff produce technical reports at the word processing centre of Ferranti's Edinburgh offices, using the Xerox 850 with 24-character display units

power is removed from the system.

Further developments in memory systems in the 1980s are likely to come from magnetic bubble memories—solid state devices in which the data is stored and controlled magnetically. Although bubble memories are still a relatively expensive form of data storage, the price is expected to fall quickly.

Other new systems could also come from applying optical video-disc systems to data storage. Such video-discs already have a storage capacity equivalent to the theoretical limit achieved by magnetic discs, although there are a number of potential drawbacks. However, it remains certain that by the end of this decade data storage systems will have made technology gains similar to the advances over the past ten years.

## With electronic funds transfer banking takes another big step Towards the 'cashless society'

THE BANKS and the financial community are welded irrevocably to the development of large computers. When IBM launched the first of its very big new machines, the 3081, two years ago, it was significant that the banks were the first in line to place orders for these computers which are able to process instructions at a rate of about 10m a second.

The UK's first 3081 was installed at National Westminster Bank's Goodmans Fields site last August. The banks need computing power of this kind to run a whole range of automated services, from cheque clearing to "through-the-wall" cash dispensers. Now they are beginning to look at the potential of smaller computers and computer-based systems.

These smaller machines can provide counter services, information on the desk top for the banking executive and speedier inter bank clearing. The banks have to provide new and attractive services, but in a way which adds little to their costs in staff or real estate.

Mr Robert Lipp, senior executive vice-president of Chemical Bank, told a conference late last year: "We in the banking industry must work aggressively to ensure the continuance of our dominant position in the payment system arena of the future. Failure to do this may well leave us stripped of the most profitable segment of the retail market, and to make matters worse, added with the most expensive and outmoded delivery system in the market!"

Faced with this prospect, the banks are not sitting still. In fact, only weeks ago, Chemical Bank (which is one of the largest New York banks) introduced formally a new service called ChemLink.

Described as an international computer-based cash management system, ChemLink runs on the largest and most powerful computer bureau network commercially available, the Mark III service provided by Geisco. Geisco, the computer services arm of the General Electric Company of the U.S., has three supercomputer centres, two in the U.S. and one in Holland, to link its users in some 26 countries.

Geisco has traditionally offered its customers access to the Mark III network through a simple computer terminal installed in the customer's office and linked to the nearest network access point by telephone. The significance of the new service offered by Chemical Bank in collaboration with Geisco is that banking facilities can now be offered to corporate clients on the same basis—a company can carry out a significant proportion of its banking from its own offices using a computer terminal which can be as simple or as elaborate as it desires.

**Principle**

The ChemLink system developed in the U.S. out of necessity (the McFadden Act prevents U.S. banks from providing commercial banking services in more than one state) but it embodies a principle which is going increasingly to shape banking at a corporate and personal level: the principle of making the customer do more of the work. This can only be achieved by the use of computer-based technology.

According to Chemical Bank, for example, "Within two hours of money entering or leaving an account with Chemical Bank in London, the transaction can be reported by ChemLink in detail. The same is true of many transactions on New York accounts... No other system currently operating approaches the speed of reporting provided by ChemLink." Probably true, but for how long? All the major banks are working on ChemLink-type systems and will announce them in due course.

The banks have traditionally bought their mainframe computers from IBM—which has the lion's share of the banking market in this country, Burroughs and NCR. Other manufacturers, Philips, Olivetti, Data-Sab and so on have made their marks in specific areas. But with the development of micro-computer based systems, a whole new range of companies has moved into the financial arena. Fortron, for example, is a comparatively small company based in Dunfermline, Fife, which has achieved a growing reputation for financial terminals based on its work with Barclays Bank in an experiment

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- Apr 5 Electronic Components  
*Electronic Components Industry Federation Show — April 20-22*
- Apr 13 The Electronic Office (part 1)
- Apr 20 The Electronic Office (part 2)  
*Survey to be published at the time of the Hannover Fair in two parts, the second to coincide with the opening "Communications '82" — April 20-23*
- June 2 Defence Industries
- June 8 Small Business Systems
- July 7 Medical Electronics
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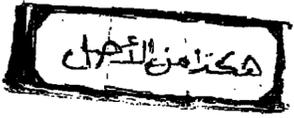
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CONTINUED ON NEXT PAGE

COMPUTERS XVII



A finance communication system (right), the IBM 4700 provides banks, building societies and other financial institutions with a family of compact computer devices for front and back-office operations. The system features a range of compact terminals to allow staff to process transactions quickly. The 4700 system is compatible with the IBM 3600 series of finance industry products and aims to offer improved performance and larger main storage capacity.



Elaine Williams discusses new work on artificial intelligence

Robots that talk and listen

SCIENCE FICTION writers have long produced tales about human-like robots, capable of coherent speech and rational thought. The idea began with Karel Capek, the Czech writer, in the 1920s who first coined the word robot to describe sinister humanoid machines in a stage play and continues with the eccentric, but rather more lovable robot characters of R2D2 and C3PO, found in the film "Star Wars."

In reality, robots are blind, deaf and rather dumb—capable of doing relatively simple tasks which have to be programmed into the machines' memories. The robots will not deviate from their orders until a new programme is placed in its electronic memory.

Researchers throughout the world are trying, however, to develop computers and robots which can converse in human speech and be capable of learning by experience instead of following strictly to the programs stored within the electronic memory.

The work on artificial intelligence is being tackled on both the hardware and software fronts. As regards hardware, researchers are looking at ways of making robots more flexible in operation. For example, a large area of research revolves around the development of robots which can identify one particular component among many different items, pick it up and place it where needed.

The difficulties in doing this relatively simple job for a human, are enormous. The robot must be able to see—using some form of camera linked to its computer control system—and identify one component from several angles, let alone differentiate between different components.

Known as "pick and place" robots experiments are being carried out in a number of research centres worldwide including Edinburgh University in the UK and Stanford University in the U.S. At Edinburgh, researchers produced a system which could identify the various parts of a toy tractor and assemble it.

But if artificial intelligence is to emerge, the way in which computers are designed and programmed, has to be altered. A step towards this has been the emergence of Expert Systems—which looks to be a major area of interest in 1982.

mitted themselves to the equivalent of \$400m over the next 10 years for the development of fifth generation computer systems which will embody many features of the Expert system.

The simplest examples which explain an Expert system is a system developed in the U.S. called MYCIN which is an interactive system that simulates a medical consultant specialising in infectious diseases.

A use for GPs

It engages in question and answer conversation with doctors needing specialist help and in three quarters of the cases gives the same advice as a human expert.

The doctor can ask for help on the identification of micro-organisms and the prescription of antibiotics and also for explanation why it has given certain advice. Humans can also improve the computer's knowledge by telling it about relevant knowledge they realise is missing in the program.

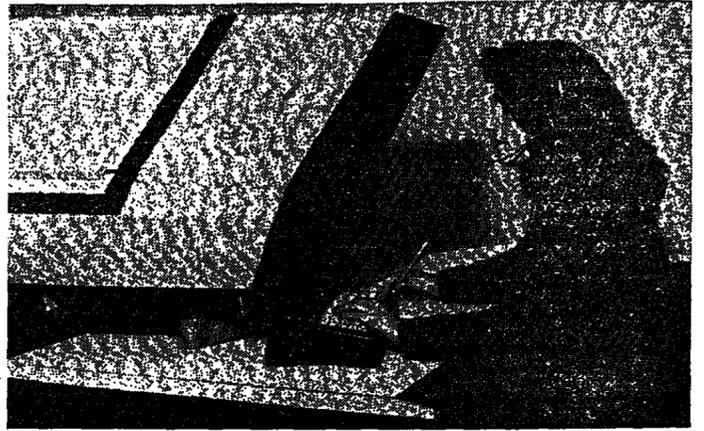
Hence a program like MYCIN does contain elements of artificial intelligence because it allows the computer to learn and to explain itself instead of producing streams of information which have to be interpreted by humans which is the most common way in which computers work today.

By comparison with the work on artificial intelligence, progress on producing machines which can understand speech and reply is much more advanced.

Many companies are working on the problems of speech synthesis and recognition and include ITT Semiconductors, General Instruments, National Semiconductor and Texas Instruments.

Texas Instruments was among the first to bring out a consumer product using techniques for speech synthesis. This was the well-known "Speak and Spell" toy which had all the circuitry squeezed onto silicon chips. There are a number of electronic chess games which also employ speech synthesis.

Work on speech synthesis is divided into two areas. They are recognition, which tries to understand what is being said and synthesis where a computer "talks" using speech information stored in its memory.



A computer-aided design system featuring voice control to speed operation and give more command flexibility has been introduced by Calma, a leading supplier of computer-aided design and manufacturing (CAD/CAM) systems to the microelectronics industry. The voice-control unit, which can hold over 50 words and can be "trained" in any language, gives the Calma system a command input rate significantly higher than with conventional systems, and demonstrations have already shown substantial productivity improvements in the design and redesign of complex integrated circuits.

The voice-control unit is supplied as an option on Calma's recently introduced vector memory display, and enables the operator (above) to take full advantage of the system's high processing speed and internal computing power. The local processing capability of the vector memory display frees the central processor from the burden of continuously refreshing the display screen and allows complex interactive functions to be carried out by single commands, and the addition of voice control allows these commands to be made without the need for a keyboard, light pen or menu display.

speech synthesis were in voice coding systems used in telecommunications but companies believe that there are numerous applications ranging from the rather frivolous such as speaking clocks to more serious ones in industry to warn operators monitoring complex or dangerous processes.

One of the most promising areas of research is aimed at telecommunications and computing applications. Companies such as Bell Northern Research and British Telecom are looking at ways in which speech recognition and synthesis can be of benefit.

For example, British Telecom's research laboratory believes that the techniques could be used for man-machine communication using voice input over the telephone lines. Commands range from asking for Prestel pages instead of

punching numbers on a keypad to ordering central heating systems to switch on remotely down the telephone line.

To reproduce electrically human speech researchers have had to study closely the system of sound reproduction which comprises four basic elements—the lungs, the vocal cords, the articulators (tongue, lips, jaw and palate) and the brain which co-ordinates everything.

Sound is simply expelled air which is altered by the articulators to produce the variety of noises which make up human speech.

Two basic techniques are used to produce speech. One is called the formant method; the other is the linear predictive coding.

In simple terms linear predictive coding tries to reproduce the shape of waveform of the sound produced while the

formant method looks at the frequency and amplitude of the component sounds.

In November, Logica the UK software company, announced Logos a research tool claimed to help the development of speech recognition systems. Based on the work of the Government Joint Speech Research, it analyses whole words in a way which is not sensitive to the speed at which a word is spoken.

Each word is analysed by breaking up the speech frequency into 19 narrow bands and looking at the energy of the sound uttered. The result is stored as a pattern of black dots called frames to which the device can compare against other spoken words.

Logica says that Logos is capable of learning 2,000 words and can recognise several hundred in one scan.

Cashless society

CONTINUED FROM PREVIOUS PAGE

in electronic funds transfer at the point of sale.

The door has also been opened to manufacturers of microcomputers and devices which convert televisions and telephones into viewdata systems. Just as Chemical Bank and its competitors are looking to provide banking services to their corporate customers in their offices, so they are planning to provide banking services to their private customers in their homes.

All that is needed is a device to display information, the domestic television set, for example, and a keyboard so that messages can be sent to the bank's computer. It also requires a stiff system of passwords for security and a certain degree of trust in the system.

Citibank, Chase Manhattan, Chemical Bank and other U.S. banks have trials running in home banking using personal computers as the communication devices. German banks are running a home banking service over the German viewdata system, Bildschirmtext. The pioneer here was Verbraucher Bank of Hamburg, whose data-processing staff wrote the necessary software to enable its customers to investigate the state of their accounts, make simple payments and so on.

In the UK, while plans are still under wraps, all the banks are active in this field, experimenting with systems provided by viewdata experts such as

Refidusion computers. IBM has traditionally dominated the market, in this country at least, for reader/sorters, huge costly computer-based machines able to read the magnetic markings on cheques and sort them into their respective piles for clearance.

These machines can process up to 2,000 cheques a minute. National Westminster, at its Goodmans Field site, has 14 IBM 3890 reader/sorters, all linked to whichever of the array of mainframes is controlling the clearing operation. A day's burden of cheques can be cleared in six passes through these machines.

Automation

This year, all the clearing banks are changing to automated clearing of credits, and a whole new market has opened up, worth some £10m a year, for the equipment to run the new system. Apart from the traditional suppliers, specialist optical recognition equipment companies such as Recognition Equipment and OCR Scandata are expected to feature strongly in the competition. Indeed National Westminster has already bought its first five credit-clearing reader/sorters from Recognition Equipment.

But banks need computers most urgently for electronic funds transfer, the substitution of the movement of electrons down a telephone line for the movement of bits of paper.

Bankers Automated Clearing Services (BACS) is an early example; the organisation accepts magnetic tapes bearing, for example, details of salary payments and prepares new tapes to be sent to the appropriate banks containing the necessary details.

Swift, the Society for Worldwide Interbank Financial Telecommunications, now has over 800 member banks in 26 countries. It is a computer-based network that represents electronic funds transfer on a grand scale. Messages are sent from bank to bank at high speed but at the most economic cost through the use of a technique called packet switching.

On a smaller scale, CHIPS provides New York banks with the means of handling international interbank dollar transfers. Last year it moved to same day settlement. The UK equivalent, CHIPS, based on Tandem minicomputers is expected to go live soon.

Late last year the clearing banks announced they had agreed on a formula to proceed with electronic funds transfer at the point of sale—the first step to the "cashless society."

It will mean the development of special terminals and communications systems to link the terminals to the banks' computers. A whole new chapter in the history of banking and computers is beginning to unfold.

Alan Cane

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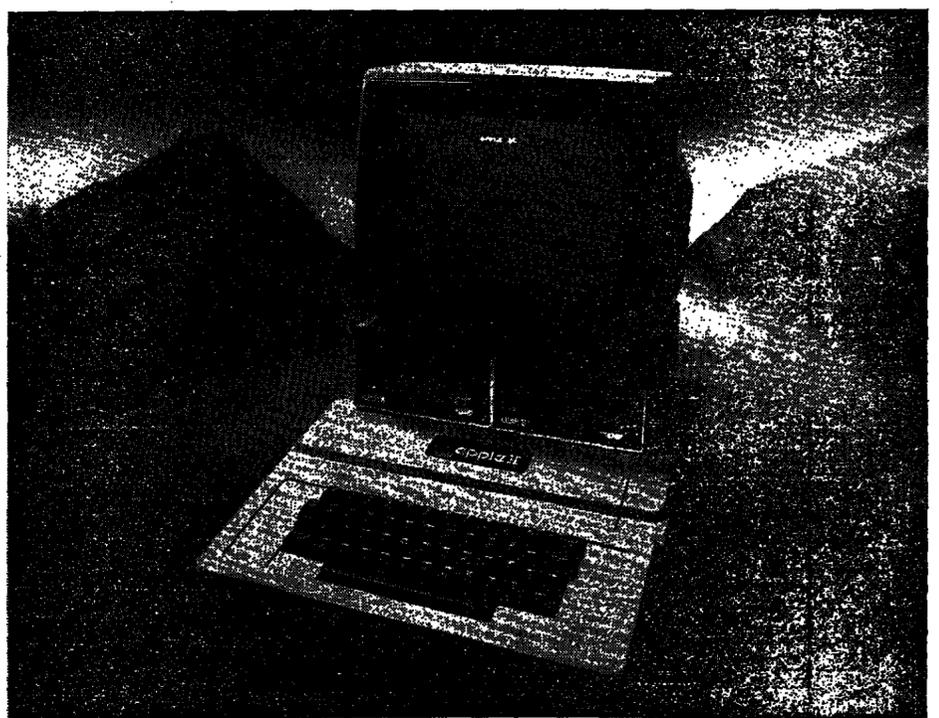
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the personal computer

# COMPUTERS XVIII

Despite doubts over privacy, microcomputer advances have aroused more interest among doctors. Jason Crisp reports

## Patient progress in the medical world

UNTIL RECENTLY most of the medical profession appeared fairly immune to computers. But the falling cost of microcomputers has begun to produce a modest use of them in hospitals and some general practices; and interest and awareness in them has grown rapidly.

According to Dr John Dawson, head of the professional and scientific division at the British Medical Association, there is still considerable resistance within the mainstream of the National Health Service to computers. "I think it is because the people who have controlled computing have been unable to get away from the idea of having mainframes."

microcomputer industry has been particularly instrumental in increasing the interest of the medical profession. The mountains of paper work, records and analysis are a natural enough area to benefit from computerisation. The obstacles have included a lack of suitable software, financial, privacy and the attitudes of doctors themselves.

Attitudes are changing. Dr Dawson says there is now a "massive interest" in computers being shown by general practitioners. He estimates that by the end of 1981 as many as two thirds of GPs had considered using computers in some way.

Considerably more computer programs for general practice

are becoming available—often written by enthusiastic doctors or by established computer companies and software houses in conjunction with the medical profession. The micro-computer also gives doctors the privacy which they would not be confident of having if the work was being processed on a mainframe at another location.

### A prediction

Eighteen months ago when the Royal College of General Practitioners predicted in a report that computers would be in widespread use in general practice within five years there were hardly any using them. Those who did were GPs with

an enthusiasm for computers and usually writing their own software. But as an extensive study for the BMA conducted by Scicon found: "Most GPs have no wish to learn how to program a computer."

A number of commercial systems are now available for GPs from specialist companies like Abies Informatics and General Practitioner Computer Systems and also from established computer software houses like CAP.

Most systems at present concentrate on the administration of the practice. Facilities include an age/sex register of patients, sometimes with an automatic recall, repeat prescriptions, drug stock control,

payroll and word processing. Some systems being developed will tell a doctor prescribing for a patient whether there are any contra-indications and whether it will interact with another drug already prescribed.

Systems of the future are likely to help a GP make a better diagnosis. Already a pilot system is being tried by the U.S. Navy in nuclear submarines (which don't have a doctor aboard) to diagnose abdominal pains.

The Scicon study for the BMA also saw a development in Encouter Systems, in which brief notes are made of consultations with each patient. It could be used to analyse recent medical history, particular

problems within the local population, trends in patient health and the workload of the GPs.

### Seven sold

The complete computerisation of clinical records is still seen as rather futuristic and fraught with problems and having a considerable effect on the way doctors work. The cost of transferring information from manual records and the memory to store it would be prohibitive at present.

Microcomputers are also being used within hospitals in a wide range of individual applications but usually only where individuals have been particularly enthusiastic. But the potential market in

hospitals is being looked at carefully by a number of computer manufacturers. Last year a new joint venture company was formed between BOC's Computer Service subsidiary and the U.S. company Shared Medical Systems, with an initial capital of £2m.

Since its formation it has sold seven patient administration systems to the National Health Service and also a system to the private Cromwell hospital. The systems cost typically between £80,000 and £100,000 and run on Digital Equipment mini computers.

Shared Medical Systems has supplied information systems to over 500 hospitals in the U.S. The domination of private

medicine in the U.S. has brought a rapid introduction of computers because of the importance of detailed financial billing.

Mr Roger Wallhouse, deputy managing director of the joint venture in the UK—British Medical Data Systems—says there has been a strong rise in demand for computer systems in hospitals in the last quarter of 1981.

Applications of computers in hospital vary greatly from administrative systems such as the management of bed occupancy, waiting lists, nursing duties, pharmacy stock control—to medical analysis of a number of tests, such as electrocardiograms.



Indicative of the medical profession's growing interest in computer aids, pictured above is a CBM PET computer with printer and dual drive floppy disc being used in a medical environment

Demands for complex weapon systems stimulate the computer industry.

## Defence needs aid technological progress

THE WORLD'S aviation and defence industries have for many years been at the spearhead of the development of computer technology—and for one simple reason. Defence has been, and still is, a high spending area of government activity and it has been traditionally one of the very few areas (space research is another) in which the so-called "frontiers of technology" have been consistently pushed forward.

Demands for ever more complex weapons systems, such as guided missiles and aircraft, have in turn generated new problems calling for new techniques to solve them. Money for such defence-related activities has not been in short supply in the past few decades, and it is probable that some of the most advanced uses of computer technology to be found anywhere in the world are now being employed in the various scientific and other research establishments of not only the Western but also the Soviet world. Many of these uses are still secret but in time they will percolate through to everyday usage.

In space research it is

certain that the problems involved in putting men on the moon and bringing them back safely, or in transmitting colour TV pictures of the surfaces of distant planets across literally billions of miles of space, could never have been solved without the extensive use of computers. It has been estimated, for example, that one recent manned Space Shuttle flight involved several trillion computer calculations to ensure the safe functioning of every aspect of the mission.

The traditional use of computers for solving abstract mathematical and other problems in the aircraft, aero-engine and guided weapons industries is now being extended by the employment of computers as specific tools in their own right. Computer-aided-design (CAD) and Computer-aided-manufacturing (CAM) are phrases increasingly heard in those industries, especially in association with computer graphics—the use of computers to create and modify pictures on cathode ray screens. Computer graphics have been compared to electricity in terms of the potential

magnitude of their eventual effects upon society, but already they are revolutionising some of the most traditional functions of the aerospace industry.

It is now possible, for example, by using computer graphics, for an aircraft designer to build up a three-dimensional picture on a cathode ray screen of what an aircraft (or other product) would look like. From this visible manifestation of his initial design concept, the designer can see at once what needs to be changed to achieve his desired objective, and it is possible to make many hundreds of changes at considerable speed. The computer-controlled system can then move on to parts drawing, then to metal cutting and parts fabrication, with greater speed and less waste, and hence considerably greater overall efficiency.

Variations on the use of computer graphics in aircraft design include what is known as "dynamic analysis" in which complex computer programs can be written to provide a picture of something that hitherto had to be provided in model form. It is possible, for example, to show by means of computer graphics what the stresses will be on the airframe in a particular aircraft design, or to see what the airflow effects on it are without actually building a model and testing it in a wind tunnel. In this way millions of calculations can be made in a few hours, obviating the necessity for actually constructing fatigue and static test specimens, or models for a wind tunnel.

It has been suggested, for example, that carried to its logical conclusion, "dynamic analysis" will eventually replace the wind tunnel entirely as a designer's tool, making the design as archaic in aerospace design as Stephenson's Rocket is to the locomotive industry of today. Virtually every major aerospace manufacturer in the



Honeywell Level 6 computers which form part of the Whitehall Defence Communications Centre's automatic message routing and distribution system

world is now making some use of computer graphics, and as the capabilities of this new tool become more widely understood the benefits will spread.

Aviation and aerospace are also leading the way in the use of CAM, in which virtually every process of manufacture, from initial materials ordering through to metal cutting, final assembly and shipment of the finished goods, is controlled by computer to save time, effort and money. Messerschmitt-Bolkow-Blohm in West Germany, for example, is using CAM to assemble wing sections of the Tornado multi-role combat aircraft.

In civil aviation, the comparatively simple use of computers in airline seat-reservations systems has been progressively extended, until today the computer is as indispensable a tool in running an airline as the aircraft themselves.

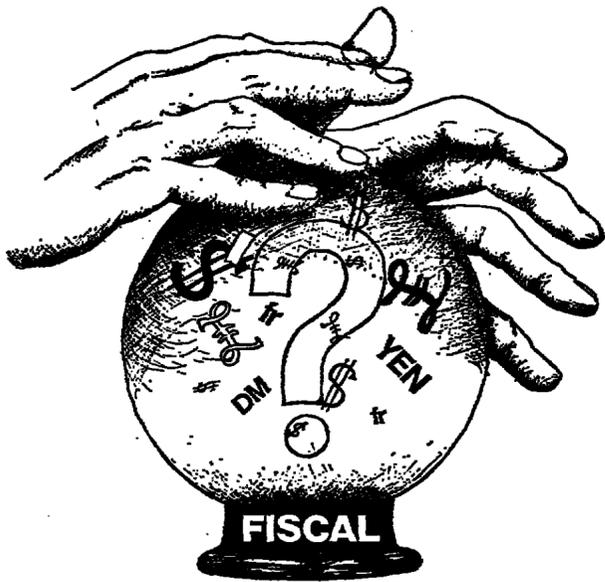
Computers are used to cover items like inventory control, and other computations, calcu-

lating flight schedules, crew training (through increasingly sophisticated flight simulation techniques), and more recently, fuel management systems that can direct aircraft through on-board computers to fly the most economical paths through the sky from take-off to touch-down. Even the flight decks of airliners themselves are about to undergo a radical transformation, with the old galaxy of dials giving way to colour cathode ray tube displays conveying all the necessary information of such things as height, altitude, speed, direction, fuel state, systems functioning and so on in the simplest possible form, to make the pilot's task easier.

In virtually every field, CAD and CAM makes the traditional design and management tasks easier, more flexible and more economic. They have already resulted in a sharp acceleration in the rate of growth of aerospace technology and this seems likely to continue in the future.

Michael Donne

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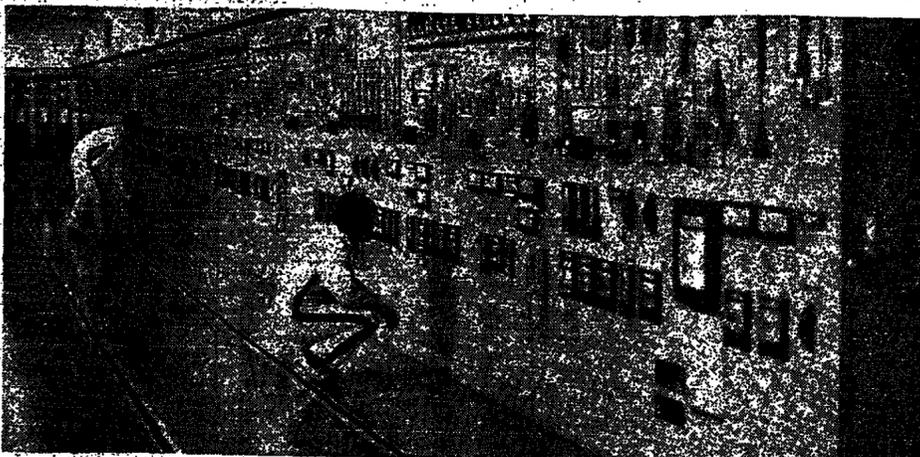
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هكذا من العمل

# COMPUTERS XIX



Computerised process controls are being increasingly used throughout industry. Above: the control room in the nuclear fuel reprocessing plant at Tokaimura, north-east of Tokyo. Safety is a key factor and surveillance must be constant

## Geoffrey Charlish on aids that cut down industrial costs Preparing for a new breed of production engineers

COMMERCIAL COMPUTERS, chasing out everything from gas bills to bank statements have generally attracted more interest and certainly more investment than any production-oriented application.

There are two main reasons: white collar workforces have usually been more amenable to change and the jobs they do are significantly easier to computerise. After all, customer accounting, salary administration and the rest are much the same everywhere.

Manufacturing is different. It involves everything from engineering design through the production process itself to final testing and packaging. As a result, computer application has been piecemeal and any existing commercial computer has been unlikely to participate.

Thus, the chief executive's vision of a centrally-controlled plant that has raw materials entering at one end and finished products coming out of the other, is still quite a way off.

The nearest approach has been in the petro-chemical industries, although the electronics industry itself has been prominent. Indeed, in semiconductor manufacture, no human, in any case, would be able to perform the testing needed.

But in industries that are assembly-dominated the problem is at its worst because of the variability. The products are all different. Mechanisation has been pre-occupying these industries for a century or more and endless ingenuity was evident long before the computer came on the scene.

Now, however, microprocessors are applying intelligence to purpose-built machines and tester equipment. Results that were being obtained by complex mechanisms and relays are now being improved upon and cost reduced by micro and new sensor technology.

Furthermore, much greater product variability can be accommodated because the changes can often be made, not by electromechanical re-fitting but by re-programming the micro from a keypad.

Each industry will continue to have its purpose-built assembly machinery but it is changing significantly as a new breed of production engineers moves up this new learning curve.

Of late, the programmable arm, now generally referred to as the robot, has made the headlines. Its main advantage is its versatility: just as the human hand can pick up and place accurately any object within its size-weight capacity, then so can the programmable arm.

But its cleverness has yet to match some of the single purpose computer-controlled handling and assembly machines found in, say, the cigarette industry, or in the automatic assembly of electronic components on to printed circuit boards.

However, before long the arms will become real robots with eyes—several groups are working on this concept in the UK alone. Robots will have pattern recognition and learning/deductive ability. Soon, they will be able to move about on the factory floor, too, and their skills will extend beyond such operations as welding, spray painting and polishing.

Working in groups, they will be able to carry out complete manufacturing and test sequences, passing parts to each other.

The so-called flexible manufacturing systems (FMS) are a step along the way. In a machine shop they are able to pick parts and cutting tools to keep computer controlled machining centres in continuous production.

**Sophistication**  
The machine tools themselves and their controlling computers are also reaching new levels of sophistication. In a recently introduced machine, from Fanuc in Japan, parts can be "constructed" on a screen and when the operator is satisfied with the "drawing" a button is pressed for high speed repetitive turning from bar stock. Eventually, such machines will be linked directly to CAD systems.

In process control, basically concerned with fluids moving in and out of vessels and along pipes, automation is the rule rather than the exception. The market contains companies such as Fischer and Porter, Babcock-Bristol, Foxboro, Honeywell, Kent Brown-Boveri, Rosemount Taylor Sybron and Westinghouse. They are all chasing the big users in the oil, petro-

chemical, brewing, beverage, food, pharmaceutical and power generation industries.

In all these companies' systems, the computer, on a continuous basis, examines temperature, pressure, flow rate, valve status, pump speed and similar plant parameters, decides what it must do to optimise the process and continually sends signals back to the heaters, pumps and other controlling devices to keep the process in specification.

Nowadays, these systems allow the process engineer to design the control scheme on a colour TV screen and the process operator to see almost anything he wants about the state of the process. He can call up coloured graphs, bar charts and trend curves and can view mimic diagrams of the plant itself with constantly updated numerical data for each vessel, pipe, pump or valve.

Process control is one of the few areas in which design of the product is integrated with its production control in the same system.

The mechanical engineering industries are working towards this too. For example, a system called PADDs has been developed at the Production Engineering Research Association in which the engineer keys in the basic shape and dimension details and the computer makes a drawing on the VDU screen.

It then goes through a reverse evolution process to arrive back at the condition of supply of the metal blank, detailing the turning or grinding operations that will be needed to produce the part. It will list, on the drawing, tasks to be allocated to the available machine tools, allocate cutting tools and will even produce a time and cost estimate if needed.

After the product has been made, it has to be tested. Most of the effort has been needed in the electronics industry itself because, since the introduction of the integrated circuit in the '60s, manual testing has either become impossibly expensive, or in some cases humanly impossible (the microprocessor chip, for example).

So a worldwide \$1bn business has grown up in the three main areas of IC and discrete component, printed board, and complete system testing. Most of the component-testing equip-

ment is bought by the semiconductor companies; electronic system and equipment makers nowadays expect to obtain good chips and most of their problems lie in testing the boards. The later they find the fault, the more expensive it becomes—the penalty can be several hundred times bigger if faults are present in products newly delivered to the customer.

Much effort has been put into board testing so that, in modern equipment a "bed of nails" multi-contact fixture descends on the PCB and a computer tests all the components and interconnections in few seconds.

**Indispensable**  
Such machines are roughly in the £50,000 to £100,000 price bracket, but are virtually indispensable to the larger electronic equipment manufacturers.

Worldwide, GenRad of Massachusetts has the lion's share of the board tester market. Other prominent vendors include Paradyne, Computer Automation, Hewlett Packard and Fluke. In Britain, Memtrain and Marconi Instruments are lead houses, although the former is part of the Schlumberger group.

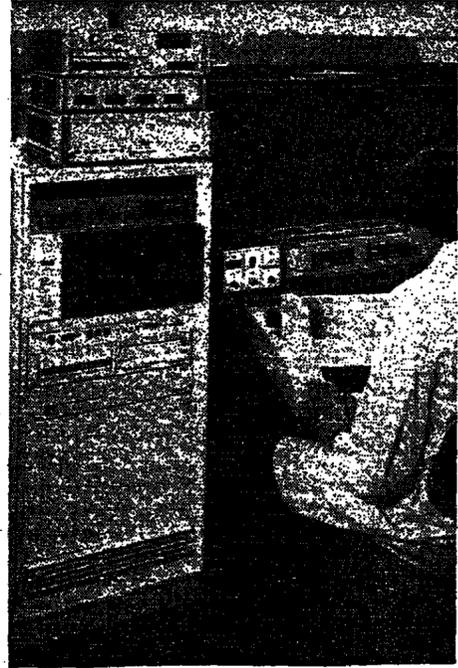
The testing of complete systems—aviation electronics is a good example—often involves stringing together a number of specialised measuring instruments which are then put through a set pattern by a computer. Hewlett Packard has scored well in this area because a transmission method it devised for connecting the instruments together was adapted five years ago as a standard in the U.S. and is now widely used throughout the world (e.g. the IEEE 488 bus). System test holds the biggest market share in autotest, mainly due to U.S. and European military influence.

Computers are being increasingly applied in other manufacturing areas such as packaging and materials storage and several of the computer makers offer shop-floor systems that look after work in progress, stock management, costing, order input and bill of materials.

Eventually, all the systems will work together. But not just yet.



Digital computers are used extensively in laboratory applications (left); a computer-based data acquisition system (right) from Base Ten forms part of a test system for commercial vehicles manufactured by Leyland. Base Ten has also supplied a data-



conversion system to Leyland, together with a software package to produce half-inch 9-track computer tapes, suitable for analysis on Leyland's GEC 40-82 computer

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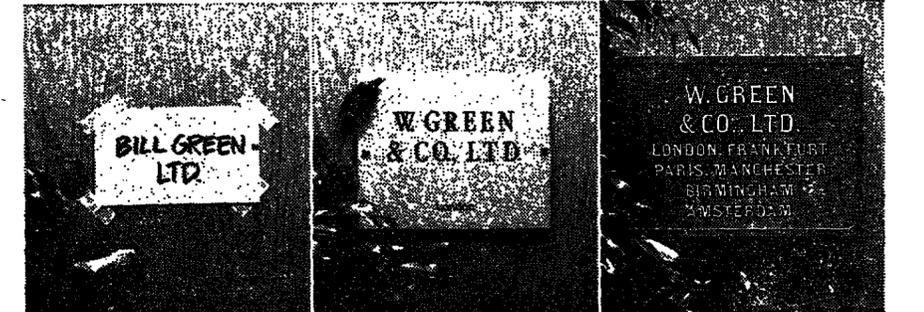
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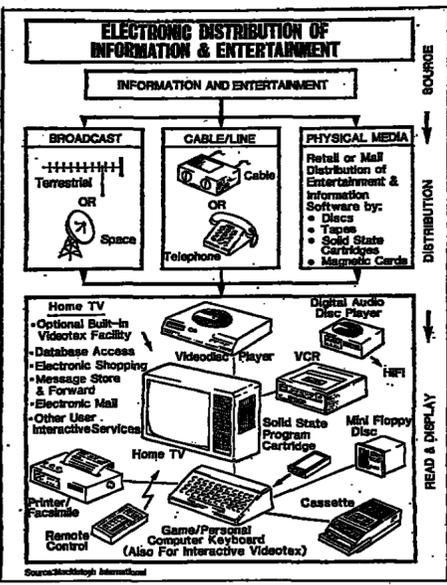
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# COMPUTERS XX

Michael Dixon examines the prospects for computer-assisted learning in the schools

## Making the classroom a livelier place



THE LONG-NEGLECTED customers of the education service—children whose intelligences run in directions other than the conventionally academic—have at last found a political champion. He is Sir Keith Joseph, Secretary for Education and Science, and his concern for these pupils borders on educational heresy.

Only the other day, for instance, he went beyond merely doubting that they thrive on the watered-down scholarly study which is all they are offered by most schools. This might well contribute to the demotivation, the boredom and even truancy of many of them," Sir Keith told a conference in Leeds.

The result, he suggested, was that many ended 11 years of compulsory school lacking basic skills of reading, writing or numbering, as well as self-discipline and ability to concentrate.

"It may be that these children will absorb more readily these basic skills and basic attitudes... if the curriculum offers them more opportunities to use their knowledge—and the other skills and qualities they need—in practical applications."

he said. But Sir Keith's public expression of concern for the many thousands of pupils ill-served by conventional curricula, drew little more than cynical shrugs from certain small groups of would-be innovators in local education authorities and schools. The cynics, who would much prefer to be enthusiasts, consist of officials and teachers trying to spread throughout the UK educational network the great improvements in the process of learning which are offered by the computer.

The arrival of the micro and the attendant possibility of applying computer-assisted learning (CAL) to virtually the whole curriculum of every school, could evidently be a blessing both to the teachers and to the life prospects of the children now championed by the Education Secretary.

"When well prepared and properly used, CAL has done wonders in motivating previously alienated kids," said one educational inspector. "Learning to make the computer do things—and most children seem to pick it up very fast—seems to switch them on to the more normal work. We don't know why

this happens, but it does. The only trouble is that unless you motivate these kids early on, well before they leave primary school, they tend to be lost to education for ever after. And rather than concentrating the resources we have on using computers to enrich the whole of education from the bottom up, as it were, we're dissipating them."

During the past decade educators have begun to use the computer as more than an adjunct—a super-calculator with a memory—in conventional methods of teaching sciences and other numerically linked subjects such as economics and geography.

Computer studies, in the sense of the use and the role of electronic data-processing, have been added to the curriculum in many secondary schools and can now be taken as subjects in the 16-plus examinations. Schools are also teaching older pupils programming as a subject in its own right.

The development of usage from the academic heights of education downwards was perhaps inevitable given the initial dependence of most colleges and schools on time-sharing facilities. Since only a

few pupils could have access to a terminal at any one time, small groups such as those studying for GCE Advanced-level exams could benefit most effectively.

But in the micro, schools have potentially gained far greater abilities. They can extend the use of the computer to a wide range of studies, using it to automate fundamental experiments in academic subjects such as chemistry and to log data gathered in less-specialised projects, so that it becomes integral to the control of the entire learning process.

Moreover, simultaneous access can be given to large numbers of children simply by "linking up a lot of monitors in a daisy-chain," as the inspector put it. "So there's not a shred of doubt that the possibility of building the computer into the educational culture right from the early years of primary schooling is there to hand."

But this highly desirable aim can be achieved only by a concentration of efforts, especially those of the nucleus of teachers who largely on their own initiative have pioneered computer-applications and the supporting, technically expert staff in the education authorities.

"We have to get teachers to define what they're trying to develop in pupils by teaching their particular subjects, show them what the computer can do to further those objectives, and work together to produce the software required."

Where hardware is concerned, there has been a considerable degree of concentration—to the chagrin of micro-computer companies whose products have not been chosen for general use in schools. While other systems are to be found in various places, the one which seems to be preferred at present is the Research Machines 380Z.

In theory, this is likely to be superseded by the BBC system for education being developed in conjunction with Acorn.

"Electronically speaking, it's a superb design and it could be built up gradually from an initial purchase of only 500 or so. But there seem to be difficulties in producing the schools' model, and whether it'll be robust enough nobody can be sure."

Even so, the hardware is far less of a problem than the development of the necessary software and the training of large enough numbers of teachers sufficiently thoroughly to use the new development effectively.

The training would require staff to be released from the classrooms at a cost which, given the squeeze on local education authorities' finances, few of them could afford, the inspector said.

Nor has the major task of software development received much of a start as yet. Money for this development is notionally included in the partly inflation-proofed £5m which the Government has earmarked over the next four years for its Micro-electronics Education Programme.

But the £2.3m which has been allocated in the programme's first year has gone largely towards setting up an organisation of 14 regional centres in England, Wales and Northern Ireland, as a means of ensuring that the software is developed coherently. Very little money has been distributed to local authorities and other bodies so that they can carry forward promising programmes which already exist in embryo form.

### Surveys in the FT on new technology

FT surveys in the coming months will be examining important developments in the area of computer-based technologies and business systems.

#### Satellites

Satellites are attracting increasing commercial interest as a versatile means of transmitting both communications and broadcast signals over long distances. They are expected to play a key role in the emerging information revolution during the rest of the century. The survey on Satellite Communications and Broadcasting will appear on March 8, 1982.

#### Automated manufacturing

Manufacturing industry is on the verge of a massive increase in productivity through a combination of computer-based technologies and robotics. These developments will be examined in a special survey on March 3.

#### Electronic payment systems

Banks are looking for ways to contain escalating costs for staff and property, while remaining competitive in providing services to an ever-increasing number of customers. Retailers are seeking new ways to cut the burden of paperwork on their staff, and to speed customers through their check-outs. A survey on March 31 will explain why financial institutions and retailers will inevitably move to electronic payment systems.

#### The electronic office

In the past year there has been an unprecedented spate of activity as suppliers of computers, telecommunications and traditional office equipment vied with each other to launch their concept of the "electronic office," where pen and paper have given way to electronic systems. But how ready is the market for these advanced products? Is the office of the future just around the corner—or far in the future? This survey will appear in two parts: Office Automation on April 13, and Communications on April 20.

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### Jason Crisp on a growth area CAD/CAM still flying high

COMPUTER-AIDED design and manufacture (CAD/CAM) has become one of the fastest growth areas in the computer industry; 10 years ago CAD/CAM was little known but has recently attracted some of the world's largest companies.

CAD/CAM was originally developed for the electronics industry to help design the increasingly complex microchips and printed circuit boards. Most electronics circuits are now so complex that they would be almost impossible to design without CAD/CAM.

The CAD/CAM industry is dominated by American suppliers. A handful of independent companies grew rapidly in the U.S. through the 1970s, including Computervision, Applicon, Calma, and Autotrol. Computervision greatly outstripped its rivals in the second half of the decade. One of the reasons for Computervision's success was its early move into supplying CAD/CAM systems for mechanical engineering.

Both the aerospace and automobile industries were quick to see the advantages of CAD/CAM. In aerospace, CAD/CAM is particularly useful in designing the highly complex surface shapes for the best aerodynamic effect while achieving the maximum strength for the minimum weight.

In the automobile industry the reduced lead times in producing a new design, the ability to simulate a collision on the computer and the opportunity to avoid expensive mistakes in the building of the prototype all helped in the rapid introduction of CAD/CAM. All volume car manufacturers now use computer-aided design. EL has one of the largest CAD/CAM systems in Britain.

Most of the independent suppliers of CAD/CAM systems have been bought by large corporations in the past two years. General Electric of the U.S. bought Calma, and Schlumberger, the giant oil services group, bought Applicon, which resulted in speculation on how long Computervision would remain independent.

McDonnell Douglas, one of the pioneering companies in the development of CAD/CAM for its own use in aerospace manufacture, sells its system to other companies. International Business Machines has a fairly small share of the CAD/CAM market, but it has been advancing rapidly.

In Britain there are about 60 organisations—ranging from independent companies, software houses, subsidiaries of large companies to management consultants—which offer CAD services and systems.

Most are very small compared with the U.S. companies. Quest Automation, which boasts it is the largest independent European supplier of CAD/CAM systems, has recently reported a loss of £1.5m for the half-year to August 1981. The main problem is its very high research and development costs, combined with weak sales of its larger systems as companies defer capital investment because of high interest rates.

Quest exports over half its turnover. Although it has substantial sales in the Eastern Bloc it does not sell its systems in the U.S., which accounts for 60 per cent of the world CAD/CAM market.

Quest has specialised in the electronics industry but recently bought Genesys, a small CAD/CAM company specialising in construction and architecture, from the National Research and Development Corporation, research subsidiary.

Racal also has a CAD/CAM subsidiary. (Racal also specialises in supplying systems for design of electronics products which is of a similar size to Quest. Most of the suppliers of turnkey CAD/CAM systems use a minicomputer made by companies like DEC, Hewlett-Packard, Data General, Prime and Perkin Elmer. The most notable exception is Computervision which has developed its own computer. Quest also developed its own minicomputer after finding delivery times from the U.S. supplier rigidly extended.)

There has been considerable concern that British manufacturers are being slow to adopt CAD/CAM which may result in lower competitiveness with other countries.

سكنا من النحل

Lombard

PRAYING FOR AN UPTURN

Why De Lorean wants more

By John Griffiths

IT IS a long way from California to Belfast, but the continuing slump in the US car market now threatens serious problems for the infant De Lorean car company...



Mr John De Lorean and the first shipment of his cars in the U.S.

De Lorean wants \$80m to finance its steadily growing stocks of unsold cars. Its current \$38m line of credit from Bank of America is exhausted and without the extra finance it can barely afford to produce at a rate of 12,000 cars a year...

A golden goose laying jobs in a wasteland

If the ECGD says no and the negotiations have not been easy, De Lorean can probably still make a profit producing only 40 cars a day for the indefinite future.

But Mr John De Lorean is unwilling to comment on what this might mean for the company's 2,600 workers. For them the coming of the De Lorean plant has been akin to that of a golden goose laying jobs in an unemployment wasteland.

Today's meeting also follows the news over the allegations of financial irregularities which swirled round the company last autumn. The company was swiftly cleared of any charges.

There were aspects which the UK Government agencies involved, NIDA and the Northern Ireland Department of Commerce, did not like. The result of the ensuing squabble, says John De Lorean, was that we missed the window. By autumn, with the U.S. motor industry deep in recession, potential investors in the project were showing all the enthusiasm of a vegetarian for a T-bone steak.

Bache, Halsey, Stuart Shields, the underwriters advised a more modest offering of 1m shares at \$12 each with warrants to buy an equivalent amount later. That, too, was still-born. A third attempt was abandoned earlier this month. Mr De Lorean now accepts that it may be many months before another attempt will be made.

Then came the allegations of irregularities. "The joint effect," Mr De Lorean told the Financial Times last week, "was a hell of a lot of order cancellations. People were saying 'why should I buy a car from a company which might not be around?'"

The U.S. new car market has also performed even worse than expected in the past few months. Sales in 1981 fell for the third year in a row to 8.53m. In the sector in which the \$25,000 De Loreans compete the fall was 11 per cent. For domestic manu-

facturers it has been the worst year since 1961. That has had severe implications for De Lorean because many of its 350 dealers have U.S. volume car franchises. De Lorean should be the cream on top of the cake. With precious little cash, their ability to finance the purchase of De Loreans has become severely restricted.

The fact that they have contractual commitments to buy 43,000 De Loreans under their equity participation agreements—a factor sometimes overlooked in assessments of De Lorean's immediate prospects—is of little consolation.

As one U.S. industry analyst puts it, "De Lorean knows a lot better than to solve the company's liquidity problems by stuffing cars down their throats—and driving them to the wall."

The downturn has worsened since October, a month in which registrations hit a 20-year low. "In November they were running at an annualised rate of 8m. In December it was 6m. The 5.8m rate in this year's first 10 days are at a 30-year low," according to Mr De Lorean.

The net effect is that De Lorean has built 7,000 cars; some 4,700 have been sold to dealers; but only 3,000 registered by the final owners.

\$80m saloon project planned for 1984. De Lorean now claims it is vital to the company's long-term future, removing its dependence on one, exotic sports car and even—Mr De Lorean has said—holding out the prospect of lifting Belfast employment to 6,000 or more.

Some £19m worth of work on it must start this year—it is already in clay model form at Guinness's Industrial Design studio in Turin. Some \$22m in other planned investments may be dispensable, but De Lorean feels the saloon is essential. The UK Government has indicated that it would consider more grant and loan aid for the saloon, but only if the company looked stable and was making a profit.

To start providing that aid now would be jumping the gun in terms of the Government's own criteria and presents a more difficult decision, involving hard cash rather than guarantees.

De Lorean argues that given the high level of unemployment and the peculiar problems of Ulster the true net cost to the UK Government by August of this year is not as much as the £87m in equity, loans and grants that have actually been paid out.

Some £1.8m has already been handed back to the Government in royalty payments; £1.4m in debt servicing, £11m

turn almost certainly depends on the attitude of other government departments. That poses a knock-on dilemma for the Government both political and financial. The Government has already taken a great deal of flak about the amount of public money pumped in so far, even though it was a Labour Government's signature on the original agreement.

To provide these further guarantees will not necessarily cost more money—except in the still unlikely event of a crash—and the prospect of a reduction in jobs so soon after the plant has opened might present a less palatable alternative. But the dilemma does not end there.

De Lorean had hoped with its share flotation to do two things: first to start buying out the De Lorean Research Partnership, 125 early private backers of the De Lorean project whose \$15m investment currently entitles them to 23.4 per cent of profits and who are a clear deterrent to further fund-raising.

The second aim was to start to get cash together for the

A new kind of competition

By Samuel Brittan

A NOVEL kind of competition is to be held in April. It is for Social Science Research Council (SSRC) funds between full-scale models of the British economy.

The SSRC is spending about £0.5m per annum to support four main teams: the National Institute of Economic and Social Research (NIESR), the London Business School (LBS), the Cambridge Economic Policy Group (CEPG) and the "other" Cambridge team—the Cambridge Growth Project. So far, the funds for the four teams have been allocated on an ad hoc basis. Following the recommendation of an SSRC sub-committee, there is going to be an open competition for qualified applicants for the four years from September 1983.

The existing teams are all expected to reapply. In addition, the *Minford Liverpool Model*, which now receives a prototype for "baby" grants, is expected to apply for full-scale funding. There will also be an application from Professor Michael Beenstock's newly formed City University Institute for Financial and Economic Research (CIFER).

The NIESR and the two Cambridge groups would be regarded as Keynesian, with the Cambridge Groups being more interested in the longer term, and the Growth Project specialising in sectoral breakdown. Liverpool and CIFER would be regarded as classical (so-called "monetarist") while the LBS is seen as in-between ("moderate monetarist").

The Keynesian groups regard output as demand determined, the monetarist ones as supply determined, and the LBS as supply determined in the long run but demand determined in the short. The novelty of CIFER is that it will study the long-term growth of output from the supply side—including the effects of public expenditure and its financing.

Michael Posner, the SSRS chairman, has likened the new system to a pool where "life is brisk and the inhabitants have to work for their food; but for

four years at a time, food in return for work is guaranteed." In fact, the food supply is likely to be trimmed by up to 20 per cent both because of "cuts" and to accommodate a new central unit to provide common services, evaluation and a point of contact for outsiders. The committee judges would be within their rights in trying to arrange some rationalisation, eg, putting the NIESR and one of the Cambridge groups together to provide a Keynesian model, both short-term and long, and putting CIFER with the LBS or Liverpool for a comprehensive classical approach.

The Rothschild idea of direct contracts from interested government departments would be a bad idea. In this instance, where the most important questions are not always the ones governments like asking, and where a buffer is needed to protect research teams from the political and Civil Service fashions of the moment, two-thirds of the Treasury's exploring research grant to the NIESR is being switched to the SSRC, thus ending an unhealthy symbiotic relation.

If the whole of Government, academic and private financing on macro models of all kinds is added together, it amounts to about half the cost of *Brideshead Revisited*. Although such models are more likely to provide "normal science" rather than intellectual breakthroughs, they are the research technique favoured by some of the most go-ahead young economists, including even the critics of conventional forecasting.

Many of the models represent the working out of the vision of one or two dominant personalities. This is both inevitable and desirable in the present state of the subject.

There is thus a very strong case for continuing the work—so long as it is not regarded as the whole of economics and that it is not erroneously supposed to be a la Jeremy Bray that Government policy can be decided by examining the technical entrails of the rival beasts.

Letters to the Editor

The dress industry and the multi-fibre arrangement

From the General Secretary, National Union of Tailors and Garment Workers. Sir—Workers in the clothing industry, under constant threat of losing their jobs, can surely be forgiven for sometimes wondering just what use international trade agreements like the multi-fibre arrangement really are. For all too often the terms of the agreements seem to be ignored by the exporting countries and neither monitored nor policed by the European Commission. Scepticism will surely grow at the news of the Commission's reaction to the massive surge

of imports of dresses from Korea (January 13). During 1980 imports of such dresses totalled 202,000. For the first nine months of 1981 however, this figure had increased by over 325 per cent to 860,000. Under the basket extractor procedures contained in the MFA, the European Community is enabled to ask for a category of garments from a single source to be put under quota where these reach a certain proportion of total imports. Having quite clearly failed to spot the difficulties in time, the European Commission proceeded to negotiate an agree-

Transport and the public

From Mr A. Bailey. Sir—The letter from the chairman of London Transport (January 11) is typical of those who made comparisons with other countries, but fail to say that the UK cannot afford hefty subsidies whereas others can—Paris, for example. Management and unions should make real efforts to provide a service for the public and put aside their selfish motives which are only to preserve jobs. It is doubtful if any of the leaders of both sides ever use public transport—if they did there would soon be an improvement! Alan Bailey, 44 Rothway Court, Harleford Street, SE11.

Errors of etymology

From the Managing Director, Graphic Display Systems. Sir—There is an error of etymology creeping into common use among your writers which should be remedied. It concerns the use of the word "guru" to describe certain leading figures in the financial world. According to Indian tradition a guru is one who, having attained inner mystical or spiritual knowledge through direct experience within, teaches a practice for attaining spiritual experience to those who come to him for guidance. He is a teacher, per se. One who has experienced spiritual transport or mystical experience but does not teach, is a holy man, a sadhu, not a guru. A better word from Indian culture for your writers to use would be "pundit." A pundit is a kind of priest who gives out his "wisdom" more like a preacher than the very personal relationship of a guru and his disciples. The highest—or sad-guru who has attained oneness with the ocean of spirit or universal consciousness or source of light within, is, according to tradition, divinely appointed. His own self is lost in the higher self and he can make no mistakes. A pundit, on the other hand, is self-appointed. He is liable to the human errors of egotism and vanity regarding his intellectual knowledge and he can often be wrong in his pronouncements. John H. Davidson, 76 Hemingford Road, Cambridge.

Advertise British achievements

From Mr K. McDowall. Sir—Mr East's letter (January 8) on the ammunition provided by the self-deprecatory correspondence frequently published in this country reminds me of an occasion when with a group of Fleet Street journalist colleagues, I visited a giant industrial concern in Western Germany and inquired about competition from British rivals. An urbane executive dismissed the problem but said if all else failed there was always some help to be had from us! When pressed he produced a thick scrapbook, showing cuttings from most of our newspapers—including quite a few pink ones—which he said always came in handy whenever he found a customer thinking in terms of buying from a British supplier! A senior colleague of mine still working on a Fleet Street newspaper, wif, I am sure, confirm this incident.

Scotland for the Scots

From Mr N. Kirkpatrick. Sir—I find it ironic that as the Monopolies Commission is declaring the Royal Bank of Scotland's possible merger with a foreign banking corporation to be against the public interest, a representative sample of the Scottish electorate—in Hillhead (interviewed in a System 3 poll) are willing to vote for Mr Roy Jenkins. The Commission's decision is obviously a result of public outrage at a much respected Scottish institution passing into foreign hands. The concern shown by the Monopolies Commission for the people of Scotland seems to me misplaced if the prediction of a win for the SDP in the Hillhead by-election is likely to come true. On the one hand the Scottish people are willing to fight to maintain their national identity, symbolised by the Royal Bank, yet on the other hand they apparently want to elect an MP who lives in London and knows little, if anything, about Scottish affairs. He cannot, therefore, truly represent their interests in Parliament.

Odds on or against the weather

From Mr B. Smith. Sir—Mr David Fishlock's article (January 13) on weather forecasting confirms again the folly of daily weather forecasts to us public at large. Three questions constantly arise and constantly get no answer. If it is impossible to predict with accuracy what the weather will be in one relatively small locality, why bother? If it is very largely true that today's weather will persist tomorrow, can the weather men offer better odds? Why are there no odds-on or odds-against quoted by the weather men, no apologies for errors, and no direction of movement indicators on their beloved satellite pictures, which renders them meaningless? Brian P. Smith, 13, Old Court House, Old Court Place, WS.

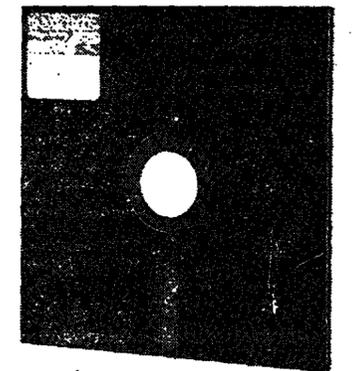
Scotland for the Scots

It was about the time the QE2 was on its trials and the headlines being run were "Ship of Shame." Looking back, that ship has been a remarkable flag-carrier for Britain, earning millions in overseas currency and, though nearing the end of her years, is still a superb advertisement for British skill. I cannot help wondering whether we are now screwing up the potential of the advanced passenger train. The coverage of its trials given will be of great assistance to those French salesmen who are busily trying to seek overseas customers for what is undoubtedly a good industrial achievement for them.

Scotland for the Scots

mean no offence to Mr Jenkins, but I fear this by-election is being used to further

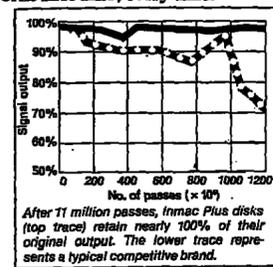
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Thos. Ward answers RTZ's revised bid and share warnings

THOS. W. WARD formally responded on Friday to the revised bid announced by Rio Tinto-Zinc on January 6. Mr Peter Frost, Ward's chairman, has reiterated his board's opposition to "this illogical bid" largely on the grounds set out on January 13 when RTZ posted its revised offer document.

Dagnall Secs. offer for C.T.R. further extended

The unconditional offer by Dagnall Securities for the outstanding capital of C.T.R. Securities at 20p a share has been further extended until 3 pm on March 24, 1982. Despatched on November 25, 1981, the offer was initially open for acceptance until 3 pm on December 16, 1981. This was extended on December 16 until 3 pm January 16. The terms and conditions of the extended offer are as set out in the document of November 25.

Plans in hand to raise £3m for Bolton independent hospital

FINAL ARRANGEMENTS are in hand for plans to raise funds to build an independent hospital in Bolton. Total costs are expected to be around £3m and this sum will be financed through locally based consultants and doctors, other interested parties within the communities and banks and City institutions.

BOARD MEETINGS

Table listing board meetings for various companies including Great Northern Investment Trust, Atlantic Assurance Trust, British Electric Tractors, etc.

U.S. company to buy video game maker

Harwyn Industries Corporation said in New York that it has agreed in principle to acquire Summit Coin of Wales, for 1.2m Harwyn shares.

FT Share Information

The following security has been added to the Share Information Service: Computer and Systems Engineering (CASE) (Section: Electricals).

BARLOW HOLDINGS

The board of Barlow Holdings says the sale of 70 per cent of Barlow Plantations Sdn Bhd was completed on January 7. Certain aspects remain to be finalised pursuant to the contracts.

Dates when some of the more important company dividend statements may be expected in the next few weeks are given in the following table.

Table of pending dividends with columns for Date, Announcement last year, and Announcement next year.

Public Works Loan Board rates

Table showing Public Works Loan Board rates for various terms from 1 year to 25 years.

Table for M. J. H. Nightingale & Co. Limited showing share prices and changes for various companies like ABI Hedges, Airsprung, etc.

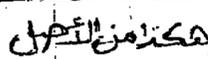
Lazard Brothers & Co. Limited advertisement featuring a quote from 'The Economist' and details of their services in financing exports and imports.

Anglo American Industrial Corporation Limited advertisement highlighting a 1,000,000 5.625 per cent cumulative first preference share issue.

THE TRING HALL USM INDEX and CORAL INDEX tables showing market performance metrics.

Large advertisement for OFFICE CHERIFIEN DES PHOSPHATES, offering a US \$175,000,000 Medium Term Loan, managed by The Kingdom of Morocco and various international banks.

Large advertisement for Thos. W. Ward, featuring the company logo and a message to shareholders: 'THERE IS EVERY REASON TO REJECT RTZ'S BID AND RETAIN YOUR WARD SHARES'.



CREDITS

Shayed margins hint of better status for Brazil

TENTATIVE INDICATIONS of easier conditions for one of the Eurocredit market's biggest borrowers emerged last week with the announcement of terms for a \$125m, eight-year credit for Brazil's development bank BNDE.

lending limits are being watched increasingly closely. Another credit launched last week after a long gestation period was the U.S.\$1.25bn, 15-year deal for the Eraring Power Station in New South Wales.

years rising to 4 per cent thereafter, and the agent is expected to be Credit Commercial de France. Romania will resume its debt discussions with international banks this week after a first round of talks held amid conditions of tight secrecy in Bucharest last Tuesday.

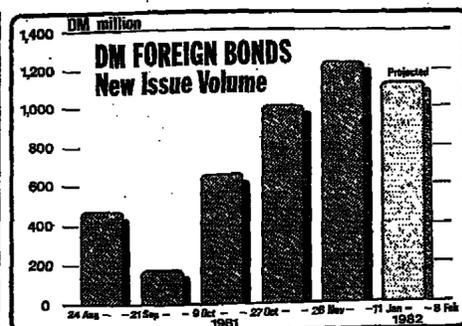
INTERNATIONAL BONDS

Fashion for zero coupons may prove shortlived

IT ALMOST SEEMED as though investors were losing interest in interest last week as no fewer than seven zero coupon bonds were offered in the Euromarket. The fashion was launched in a modest way by Salomon Brothers on Tuesday with the announcement of a \$250m issue for General Motors Acceptance Corp (GMAC).

with its first issue. The paper was placed so discreetly that it simply disappeared leaving most would-be buyers grasping vainly after a slice of the action. As a result, a mood of pent-up demand was created, in which the fashion snowballed, yet fashions in the Euromarkets have a way of changing almost as soon as they appear, and by Friday signs were emerging that the amount of paper on offer might become too great for the market to absorb.

Another new bond, the 17 1/2 per cent issue for Montreal Schools' Council—which bears a much higher coupon—was nonetheless increased to C\$30m from C\$25m. Once again there were no conventional fixed rate Euro-dollar issues last week as the secondary market continued to languish under the impact of short-term rate movements and the poor performance of the New York bond market.



GERMAN BONDS Bundesbank fights dollar disease

IT WILL require more than the stationing of a few more armed guards at the well-defended entrance to its headquarters for the Bundesbank, West Germany's Central Bank, to fend off the political onslaught which it is likely to face in the next three weeks. The German capital markets last week caught another case of dollar disease. As interest rates in the U.S. rose and fears of Federal Reserve tightening spread, rates in the German capital market began to shift higher too.

imposition of martial law in Poland, the political climate has taken a turn for the worse. All this reduces the Bundesbank's scope for lowering the Lombard rate. Yet the Bonn coalition Government has been fighting towards measures to fight unemployment, in the face of the threat that the jobless total could soon hit 2m, and an interest rate cut is widely considered to be a vital component of any such plan.

CURRENT INTERNATIONAL BOND ISSUES

Table with columns: Borrowers, Amount m., Maturity, Av. life years, Coupon %, Price, Lead manager, Offer yield %.

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In 1981 we managed or co-managed 54 issues in the Euromarket totalling more than \$4.3 billion.



- List of bond issues managed by Wood Gundy in 1981, including Ahlbitz-Price Inc., Bank of Montreal, The Bank of Nova Scotia, etc.

In addition, we participated in more than 250 Eurobond issues denominated in various currencies including US dollars, Canadian dollars, pounds Sterling, Deutsche marks, French francs, Japanese yen, Dutch florins and Norwegian kroner.

Wood Gundy Limited Offices in principal cities across Canada and in New York, London, Tokyo and Paris

This announcement appears as a matter of record only.

Imasco Limited

(Incorporated under the laws of Canada)

U.S. \$50,000,000

15 1/2% Debentures due January, 1989

Issue Price 99 1/2% (less accrued interest to January 15, 1982)

Wood Gundy Limited

- List of participating banks: Goldman Sachs International Corp., Banque Nationale de Paris, Orion Royal Bank Limited, etc.

- Grid of participating banks including: Alahli Bank of Kuwait K.S.C., Amro International, Banca della Svizzera Italiana, etc.

January 1982

U.S. BONDS

Widespread gloom over jump in money supply

THE SHOCK of a \$9.8bn increase in the money supply, M1, on Friday, capped what had already been a tough week for Wall Street, and set a bad tone for the resumption of trading today. Bond prices slumped as the news came out, and ripples reached into the foreign exchange and gold markets. Some traders thought the reaction overdone. But even if a technical rebound brings prices up again today, Wall Street wants to see large declines in M1 in the next few weeks to "wash out" the bulge and get monetary growth back on track. The jump was widely predicted because the figures covered the new year holiday week when the unusually early timing of social security payments left extra large sums in the banking system. But the consensus forecast was for a rise of about \$5bn. The jump also came on top of the upward trend in money growth that started in December, and pushed M1 way above the target set by the Federal Reserve. Over the latest statistical quarter, the measure has grown at a 10.1 per cent annual rate compared to the 2.5 to 5.5 per cent official target. Wall Street is now desperately worried that the Fed will be forced to respond to the surge by tightening credit. Whether the Fed itself is as alarmed by events is a matter of conjecture. It must have expected money growth to accelerate as a result of the easier stance it adopted briefly last autumn. But it may prefer to see how the bulge behaves in the coming weeks before taking any action. Certainly the weakness of the economy (confirmed by the 2.1 per cent drop in industrial production in December reported last Friday) creates something of a dilemma. Although some economists claim the recovery is in sight,

David Lascelles

Mobil retail unit to cut workforce

MOBIL's Montgomery Ward subsidiary said about 1,100 department store jobs will be cut as part of its previously announced restructuring programme. The retail chain said as many people as possible will be reassigned to new positions. About three jobs are being eliminated at each of the chain's 360 stores, although the larger stores will lose more positions. In the Chicago district's 15 stores, about 80 jobs have been cut.

LANDMARK LABOUR CONTRACT

Ford follows Japanese example

BY IAN HARGREAVES IN NEW YORK

FROM THE OUTSIDE, it looks as if something close to panic has set in at the Ford Motor Company.

Within a week the company for the first time dropped a quarterly dividend to shareholders, and opened at a breathless pace negotiations with the United Auto Workers union aimed at tearing up an existing three-year pay contract and replacing it with something less expensive. A few days before that Ford, faced with a disastrous 151-day U.S. stock market slump, sold some of its much-praised Escort-Lynx world car, started to offer two years' free maintenance and a 5 per cent price cut in an effort to revive sales.

The U.S. motor industry, having lost \$5bn in the past two years, simply cannot afford to pay shareholders dividends, or to pay its shop floor workers \$20 an hour when Japan is paying \$12 an hour. The recession has made it politically possible to act upon these obvious truths. Meanwhile, Mr Philip Caldwell...

well, Ford's dogged, methodical chairman, is clinging grimly to his central plan for overhauling the group's product line. He got the board to reaffirm last week that \$3.5bn will be spent on modernisation in 1982, up from \$2.5bn last year. This, at the end of a two-year period in which Ford has lost almost \$2.5bn, is no mere routine matter.

The picture at Ford is thus an unusually muddy mixture of short and long term factors. The dividend cut, which will save about \$150m this year, is both a cash conservation measure and a useful negotiating point with the union. The new contract, which might reduce Ford's \$6bn annual U.S. wage bill by 10 per cent, is a cash conservator as well as a device which might wipe out between \$2 and \$4 of the labour cost disadvantage with Japan.

But by taking the first cautious steps towards direct profit sharing for shop floor workers and by offering them firm job security commitments the Ford contract may in the long term be seen as a landmark in changing forever the adversarial labour bargaining landscape of Detroit. The Ford deal is being described in Detroit as a labour contract on the Japanese model.

The discounts on the Escort-Lynx are more worrying in the sense that they illustrate the complete failure of Detroit's massive promotion "import fighters" in the battle against Japanese cars. Import penetration of the U.S. car market has not dropped by a single percentage point in the past year. In December it actually started to rise again.

INTERNATIONAL APPOINTMENTS

Mr Martin has been chairman since 1974. Mr Silas is an executive vice president with responsibility for the company's three resource groups—exploration and production gas and gas liquids and minerals. Mr Per Boman, executive vice-president, has been appointed head of DET NORSE VERITAS' industrial and offshore division from March 1. Mr Kenneth Johnson has been appointed to the board of Continental Gummi-Werke as president early in 1982. Mr Albert Englebert has retired as president of Uniroloy Englebert Tyres, but remains on the board of Continental Gummi-Werke. Mr William C. Douce has been elected chairman and chief executive of PHILLIPS PETROLEUM COMPANY and Mr C. J. Silas has been made president and chief operating officer from April 1. The Phillips board also elected Mr Silas, Mr Glen A. Cox and Mr R. G. Wallace as directors and members of the executive committee. Mr L. H. Johnstone will become vice chairman of the board on April 1. Mr Douce, president and chief executive officer, will succeed the chairman Mr W. F. Martin when he retires at the end of March.

Amsterdam bourse to start unlisted securities market

BY CHARLES BATCHELOR IN AMSTERDAM

THE AMSTERDAM bourse will later this month start a parallel market on similar lines to the unlisted securities market in London. The new market will absorb the existing over-the-counter market.

The parallel market will begin operations on January 28 and is intended to make it easier for companies not listed on the stock exchange to raise funds. It is hoped the parallel market will act as a "stepping stone" for companies to the official exchange.

The demands made of companies listed on the parallel market are lighter than those applied to those quoted on the bourse proper. Parallel market companies need list only 10 per cent of their net capital, compared with 100 per cent on the bourse. This would allow family-owned companies to retain control of their business. The minimum capital requirement will be fl 2.5m (\$1m) as on the bourse, but companies acting as mortgage banks or consultants,

with a different capital structure, will be treated flexibly. Companies will generally be expected to provide the same information to shareholders, but the form in which this information is provided may be simpler and thus cheaper. Charges to companies for a listing will also be lower.

Changes at Champion Spark Plug

CHAMPION SPARK PLUG EUROPE, has announced a reorganisation in its European operation. The European management structure will now be as follows: Mr Björn Gilberts—director of marketing—Europe, Mr William Graham—director of finance—Europe, Mr William Wille—managing director—UK operations, Mr Annibale Fratini—managing director—Italian operations, Mr Sidney Allen—director of manufacturing—Europe and Mr Jacques Brochart—director of engineering—Europe. Smith—managing director—Belgian operations, Mr David J. Henry Schroeder Corporation has appointed Mr Jeffrey Collinson, head of the mergers and acquisitions and domestic corporate advisory services, chairman. Mr Ajit Hutheesing, formerly responsible for international corporate advisory services and project finance, has become vice-chairman. Both positions are newly created and are intended to establish new markets for the

firm and expand its share of existing markets. The company is the investment bank subsidiary of Schroeders Inc, the New York-based holding company of the Schroeder Group based in London.

Mr Robert P. Luciano will become vice-president of the company from February 1. Mr Luciano, who was president, will succeed Mr Richard J. Bennett, who continues as chairman. Mr Michael J. Lodge, president of Pakhoed USA Inc of Houston, Texas, has been appointed to the board of the parent company, PAKHOED HOLDING NV of Rotterdam, as a deputy director. He remains chief executive of Pakhoed's American division.

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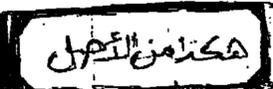
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VILLE DE MONTRÉAL 25,000,000 European Units of Account 13 1/4 per cent. Bonds due 1988. Kredietbank International Group. Algemeine Bank Nederland N.V., Amro International Limited, Bank Brussel Lambert N.V., Berliner Handels- und Frankfurter Bank, Citicorp International Group, Crédit Communal de Belgique/Gemeentekrediet van België, Crédit Lyonnais, Kuwait Investment Company (S.A.K.), Merrill Lynch International & Co., S.G. Warburg & Co. Ltd.

FT INTERNATIONAL BOND SERVICE

Table with columns for U.S. DOLLAR, OTHER STRAIGHTS, EUROBOOND TURNOVER, and various bond details including issue dates, yields, and prices.



NEW YORK

Table of New York stock market data including various company names and their prices.

1981-82

Table of 1981-82 stock market data for various companies.

1981-82

Table of 1981-82 stock market data for various companies.

1981/82

Table of 1981/82 stock market data for various companies.

NEW YORK

Table of New York indices and active stocks.

AUSTRIA

Table of Austrian stock market data.

BELGIUM/LUXEMBOURG

Table of Belgian/Luxembourg stock market data.

FRANCE

Table of French stock market data.

MONTEAL

Table of Montreal stock market data.

SWEDEN

Table of Swedish stock market data.

SWITZERLAND

Table of Swiss stock market data.

TORONTO

Table of Toronto stock market data.

Additional market information, notes, and company announcements.

CURRENCIES; MONEY AND GOLD RECENT ISSUES

MONEY MARKETS

Credit shortage hits London

CONDITIONS WERE fairly tight in the London money market last week and interest rates showed a firm upward trend...

on Friday as large tax payments came through, including tobacco tax of £275m.

After falling steadily to around DM 400m on Monday borrowings by the banks under the special Lombard facility rose to DM 1.3bn on Wednesday...

The sudden tightening of conditions pushed up call money to 10.5 per cent by mid-week from less than 10 per cent at the end of the previous week...

Against this background London three-month interbank money increased to 15 1/2 per cent from 15 per cent but continued assistance by the Bank of England kept the key seven day rate down to around 14 1/2 per cent.

Total help given by the authorities was nearly £2bn during the week and conditions are likely to be difficult again this week as the tax paying season rolls on.

In Frankfurt speculation increased about a possible cut in the special Lombard rate from 10 1/2 per cent, following the decision of the Bundesbank to assist the money market by discounting commercial bills at 10 per cent for 10 days.

FRANKFURT Special Lombard 10.5 Unch'd One Mth. Interbank 10.55 Unch'd Three month 10.50 Unch'd

BANK OF ENGLAND TREASURY BILL TENDER

Table with columns for Jan. 16, Jan. 9, Jan. 15, Jan. 8. Rows include Bills on offer, Total of applications, Top accepted rate, etc.

WEEKLY CHANGE IN WORLD INTEREST RATES

Table showing weekly change in interest rates for London, Tokyo, Brussels, Amsterdam, and other cities.

FT LONDON INTERBANK FIXING

Table showing interbank fixing rates for 3 months U.S. dollars and 6 months U.S. dollars.

LONDON MONEY RATES

Table showing London money rates for various currencies and terms.

London—band 1 bills mature in up to 14 days, band 2 bills 15 to 33 days, and band 3 bills 34 to 65 days.

EURO-CURRENCY INTEREST RATES (Market closing Rates)

Table showing Euro-currency interest rates for various currencies and terms.

THE POUND SPOT AND FORWARD

Table showing pound spot and forward rates for various currencies.

CURRENCIES AND GOLD

Dollar strong

The dollar continued to advance in the foreign exchange market last week. Eurodollar interest rates were firmer, with three-month rising to 14 1/2 per cent...

THE DOLLAR SPOT AND FORWARD

Table showing dollar spot and forward rates for various currencies.

FORWARD RATES AGAINST STERLING

Table showing forward rates against sterling for various currencies.

OTHER CURRENCIES

EXCHANGE CROSS RATES

Table showing exchange cross rates for various currencies.

OTHER CURRENCIES

Table showing other currencies and their exchange rates.

CURRENCY MOVEMENTS

Table showing currency movements and exchange rates.

OTHER CURRENCIES

EXCHANGE CROSS RATES

Table showing exchange cross rates for various currencies.

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Table showing exchange cross rates for various currencies.

EQUITIES

Table showing equity prices and movements for various stocks.

FIXED INTEREST STOCKS

Table showing fixed interest stock prices and movements.

"RIGHTS" OFFERS

Table showing rights offers for various companies.

LOCAL AUTHORITY BOND TABLE

Table showing local authority bond information.

FT UNIT TRUST INFORMATION SERVICE

Table showing FT unit trust information service details.

OFFSHORE & OVERSEAS FUNDS

Table showing offshore and overseas fund details.

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AUTHORISED UNIT TRUSTS

Table listing various authorised unit trusts with columns for name, manager, and other details.

FT UNIT TRUST INFORMATION SERVICE

Main table containing detailed information for numerous unit trusts, including names, managers, and performance data.

INSURANCE PROPERTY BONDS

Table listing insurance and property bond products with associated company names and details.

NOTES section at the bottom left of the page, providing additional information and disclaimers.

**WOLSELEY HUGHES**  
Central to Britain's heating  
Heating and Plumbing Merchants  
Farm and Garden Machinery, Engineering, Plastics.

# FT SHARE INFORMATION SERVICE

## FOOD, GROCERIES—Cont.

### BRITISH FUNDS

**"Shorts" (Lives up to Five Years)**

Stock	Price	% Chg	Yield
15B	100	—	—
15C	100	—	—
15D	100	—	—
15E	100	—	—
15F	100	—	—
15G	100	—	—
15H	100	—	—
15I	100	—	—
15J	100	—	—
15K	100	—	—
15L	100	—	—
15M	100	—	—
15N	100	—	—
15O	100	—	—
15P	100	—	—
15Q	100	—	—
15R	100	—	—
15S	100	—	—
15T	100	—	—
15U	100	—	—
15V	100	—	—
15W	100	—	—
15X	100	—	—
15Y	100	—	—
15Z	100	—	—

### Five to Fifteen Years

Stock	Price	% Chg	Yield
16A	100	—	—
16B	100	—	—
16C	100	—	—
16D	100	—	—
16E	100	—	—
16F	100	—	—
16G	100	—	—
16H	100	—	—
16I	100	—	—
16J	100	—	—
16K	100	—	—
16L	100	—	—
16M	100	—	—
16N	100	—	—
16O	100	—	—
16P	100	—	—
16Q	100	—	—
16R	100	—	—
16S	100	—	—
16T	100	—	—
16U	100	—	—
16V	100	—	—
16W	100	—	—
16X	100	—	—
16Y	100	—	—
16Z	100	—	—

### Over Fifteen Years

Stock	Price	% Chg	Yield
17A	100	—	—
17B	100	—	—
17C	100	—	—
17D	100	—	—
17E	100	—	—
17F	100	—	—
17G	100	—	—
17H	100	—	—
17I	100	—	—
17J	100	—	—
17K	100	—	—
17L	100	—	—
17M	100	—	—
17N	100	—	—
17O	100	—	—
17P	100	—	—
17Q	100	—	—
17R	100	—	—
17S	100	—	—
17T	100	—	—
17U	100	—	—
17V	100	—	—
17W	100	—	—
17X	100	—	—
17Y	100	—	—
17Z	100	—	—

### Undated

Stock	Price	% Chg	Yield
18A	100	—	—
18B	100	—	—
18C	100	—	—
18D	100	—	—
18E	100	—	—
18F	100	—	—
18G	100	—	—
18H	100	—	—
18I	100	—	—
18J	100	—	—
18K	100	—	—
18L	100	—	—
18M	100	—	—
18N	100	—	—
18O	100	—	—
18P	100	—	—
18Q	100	—	—
18R	100	—	—
18S	100	—	—
18T	100	—	—
18U	100	—	—
18V	100	—	—
18W	100	—	—
18X	100	—	—
18Y	100	—	—
18Z	100	—	—

### INT. BANK AND O'SEAS GOVT. STERLING ISSUES

Stock	Price	% Chg	Yield
19A	100	—	—
19B	100	—	—
19C	100	—	—
19D	100	—	—
19E	100	—	—
19F	100	—	—
19G	100	—	—
19H	100	—	—
19I	100	—	—
19J	100	—	—
19K	100	—	—
19L	100	—	—
19M	100	—	—
19N	100	—	—
19O	100	—	—
19P	100	—	—
19Q	100	—	—
19R	100	—	—
19S	100	—	—
19T	100	—	—
19U	100	—	—
19V	100	—	—
19W	100	—	—
19X	100	—	—
19Y	100	—	—
19Z	100	—	—

### CORPORATION LOANS

Stock	Price	% Chg	Yield
20A	100	—	—
20B	100	—	—
20C	100	—	—
20D	100	—	—
20E	100	—	—
20F	100	—	—
20G	100	—	—
20H	100	—	—
20I	100	—	—
20J	100	—	—
20K	100	—	—
20L	100	—	—
20M	100	—	—
20N	100	—	—
20O	100	—	—
20P	100	—	—
20Q	100	—	—
20R	100	—	—
20S	100	—	—
20T	100	—	—
20U	100	—	—
20V	100	—	—
20W	100	—	—
20X	100	—	—
20Y	100	—	—
20Z	100	—	—

### COMMONWEALTH AND AFRICAN LOANS

Stock	Price	% Chg	Yield
21A	100	—	—
21B	100	—	—
21C	100	—	—
21D	100	—	—
21E	100	—	—
21F	100	—	—
21G	100	—	—
21H	100	—	—
21I	100	—	—
21J	100	—	—
21K	100	—	—
21L	100	—	—
21M	100	—	—
21N	100	—	—
21O	100	—	—
21P	100	—	—
21Q	100	—	—
21R	100	—	—
21S	100	—	—
21T	100	—	—
21U	100	—	—
21V	100	—	—
21W	100	—	—
21X	100	—	—
21Y	100	—	—
21Z	100	—	—

### LOANS

Stock	Price	% Chg	Yield
22A	100	—	—
22B	100	—	—
22C	100	—	—
22D	100	—	—
22E	100	—	—
22F	100	—	—
22G	100	—	—
22H	100	—	—
22I	100	—	—
22J	100	—	—
22K	100	—	—
22L	100	—	—
22M	100	—	—
22N	100	—	—
22O	100	—	—
22P	100	—	—
22Q	100	—	—
22R	100	—	—
22S	100	—	—
22T	100	—	—
22U	100	—	—
22V	100	—	—
22W	100	—	—
22X	100	—	—
22Y	100	—	—
22Z	100	—	—

### Public Board and Ind. Financial

Stock	Price	% Chg	Yield
23A	100	—	—
23B	100	—	—
23C	100	—	—
23D	100	—	—
23E	100	—	—
23F	100	—	—
23G	100	—	—
23H	100	—	—
23I	100	—	—
23J	100	—	—
23K	100	—	—
23L	100	—	—
23M	100	—	—
23N	100	—	—
23O	100	—	—
23P	100	—	—
23Q	100	—	—
23R	100	—	—
23S	100	—	—
23T	100	—	—
23U	100	—	—
23V	100	—	—
23W	100	—	—
23X	100	—	—
23Y	100	—	—
23Z	100	—	—

### Building Societies

Stock	Price	% Chg	Yield
24A	100	—	—
24B	100	—	—
24C	100	—	—
24D	100	—	—
24E	100	—	—
24F	100	—	—
24G	100	—	—
24H	100	—	—
24I	100	—	—
24J	100	—	—
24K	100	—	—
24L	100	—	—
24M	100	—	—
24N	100	—	—
24O	100	—	—
24P	100	—	—
24Q	100	—	—
24R	100	—	—
24S	100	—	—
24T	100	—	—
24U	100	—	—
24V	100	—	—
24W	100	—	—
24X	100	—	—
24Y	100	—	—
24Z	100	—	—

### FOREIGN BONDS & RAILS

Stock	Price	% Chg	Yield
25A	100	—	—
25B	100	—	—
25C	100	—	—
25D	100	—	—
25E	100	—	—
25F	100	—	—
25G	100	—	—
25H	100	—	—
25I	100	—	—
25J	100	—	—
25K	100	—	—
25L	100	—	—
25M	100	—	—
25N	100	—	—
25O	100	—	—
25P	100	—	—
25Q	100	—	—
25R	100	—	—
25S	100	—	—
25T	100	—	—
25U	100	—	—
25V	100	—	—
25W	100	—	—
25X	100	—	—
25Y	100	—	—
25Z	100	—	—

### AMERICANS

Stock	Price	% Chg	Yield
26A	100	—	—
26B	100	—	—
26C	100	—	—
26D	100	—	—
26E	100	—	—
26F	100	—	—
26G	100	—	—
26H	100	—	—
26I	100	—	—
26J	100	—	—
26K	100	—	—
26L	100	—	—
26M	100	—	—
26N	100	—	—
26O	100	—	—
26P	100	—	—
26Q	100	—	—
26R	100	—	—
26S	100	—	—
26T	100	—	—
26U	100	—	—
26V	100	—	—
26W	100	—	—
26X	100	—	—
26Y	100	—	—
26Z	100	—	—

### Canadians

Stock	Price	% Chg	Yield
27A	100	—	—
27B	100	—	—
27C	1		

INDUSTRIALS—Continued

Table of industrial stocks including companies like British Petroleum, Shell, and ICI, with columns for stock price, last price, and percentage change.

LEISURE

Table of leisure stocks including companies like British Skyways, British Telecom, and British Airways.

PROPERTY—Continued

Table of property stocks including companies like British Land, City of London Real Estate, and National Westminster.

INVESTMENT TRUSTS—Cont.

Table of investment trusts including companies like British Venture, British Venture, and British Venture.

OIL AND GAS—Continued

Table of oil and gas stocks including companies like British Petroleum, Shell, and ICI.

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MINES—Continued

Table of mine stocks including companies like Anglo American, Anglo American, and Anglo American.

MOTORS, AIRCRAFT TRADES

Table of motor and aircraft trade stocks including companies like British Leyland, British Leyland, and British Leyland.

SHIPPING

Table of shipping stocks including companies like British Shipways, British Shipways, and British Shipways.

SHOES AND LEATHER

Table of shoes and leather stocks including companies like British Shoe, British Shoe, and British Shoe.

SOUTH AFRICANS

Table of South African stocks including companies like Anglo American, Anglo American, and Anglo American.

TEXTILES

Table of textile stocks including companies like British Textiles, British Textiles, and British Textiles.

NEWSPAPERS, PUBLISHERS

Table of newspaper and publisher stocks including companies like British Newspapers, British Newspapers, and British Newspapers.

PAPER, PRINTING ADVERTISING

Table of paper, printing, and advertising stocks including companies like British Paper, British Paper, and British Paper.

TOBACCO

Table of tobacco stocks including companies like British Tobacco, British Tobacco, and British Tobacco.

TRUSTS, FINANCE, LAND

Table of trusts, finance, and land stocks including companies like British Trusts, British Trusts, and British Trusts.

OVERSEAS TRADERS

Table of overseas trader stocks including companies like British Overseas, British Overseas, and British Overseas.

RUBBERS AND SISALS

Table of rubber and sisal stocks including companies like British Rubbers, British Rubbers, and British Rubbers.

TEAS

Table of tea stocks including companies like British Teas, British Teas, and British Teas.

MINES

Table of mine stocks including companies like Anglo American, Anglo American, and Anglo American.

Table of copper stocks including companies like Anglo American, Anglo American, and Anglo American.

NOTES

Unless otherwise indicated, prices and dividend rates are in pence and decimalized, are 25c. Estimated price/earnings ratios and covers are based on latest available financial statements and are calculated on a 'net' basis.

India and Bangladesh

Table of India and Bangladesh stocks including companies like Anglo Indian, Anglo Indian, and Anglo Indian.

Sri Lanka

Table of Sri Lanka stocks including companies like Anglo Sri Lanka, Anglo Sri Lanka, and Anglo Sri Lanka.

MINES

Table of mine stocks including companies like Anglo American, Anglo American, and Anglo American.

REGIONAL MARKETS

Table of regional market stocks including companies like Anglo American, Anglo American, and Anglo American.

OPTIONS

Table of options stocks including companies like Anglo American, Anglo American, and Anglo American.

INSURANCE

Table of insurance stocks including companies like British Insurance, British Insurance, and British Insurance.

OIL AND GAS

Table of oil and gas stocks including companies like British Petroleum, British Petroleum, and British Petroleum.

Diamond and Platinum

Table of diamond and platinum stocks including companies like British Diamonds, British Diamonds, and British Diamonds.

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'DRASTIC' ACTION PROMISED TO OPEN MARKETS TO IMPORTS

Vow on Japanese trade bar

BY REGINALD DALE, U.S. EDITOR, IN KEY BISCAYNE, FLORIDA

JAPAN will take "drastic" action soon to open its markets to foreign imports by removing non-tariff barriers to trade, Mr. Shimano Aso, the Minister of International Trade and Industry, said at the weekend. Officials at the talks said Mr. Aso had mentioned health and safety standards and product-testing arrangements as possible areas for action as well as faster reductions in tariffs. They understood him to be going considerably further to open up Japanese markets than measures already announced by the new Government that took office in November. European officials at the talks nevertheless said they feared that Japanese action, as in the past, would be "little and late". The U.S. and the EEC have warned Tokyo in recent months that it must open its markets or face the danger of retaliatory action from its trading partners. The Europeans also expressed alarm at the idea of trade "reciprocity" currently under

study in Washington, under which foreign countries would be allowed access to the U.S. market only to the extent that their own markets were open to American goods. European officials said that such thinking could mean a return to the beggar-my-neighbour policies of the 1930s and fracture the open world trading system that had been developed since the Second World War. After the talks Mr. William Brock of the U.S. trade representative, tried to dispel these fears. At an open-air press conference on a private gold course Mr Brock said the U.S. did not want "to climb on the back of a tiger" that would be difficult to get off. He said Washington was looking for "affirmative" reciprocity in the sense of asking others to open their markets. It was not the Reagan Administration's intention to take "negative steps" that would reduce trade

volumes or to act selectively, in a way that would undermine the multilateral world trade system, he said. He said the meeting had agreed to try to manage trade problems in accordance with the GATT objectives, of "free and mutually beneficial trade". The participants also said they had agreed to consult each other in future before taking any "precipitous" trade action. Officials said it had also been agreed that greater emphasis should be placed on industrial co-operation through opening up capital markets, particularly the Japanese market, to mutual investment, and that work should go ahead on U.S. proposals for liberalising trade and investment in services. The meeting made no attempt to resolve current trade disputes, such as that between the U.S. and the EEC over European steel exports. The steel issue was discussed, but no progress was made, officials said.

Crucial talks on De Lorean

BY JOHN GRIFFITHS

THE UK Government-backed De Lorean sports car company is likely to be told today whether \$60m (£32m) \$70m in export finance guarantees will be provided by the Export Credits Guarantee Department to overcome the company's increasing cash flow difficulties. Obtaining the guarantees has assumed major importance to De Lorean, which has reached the \$50m ceiling of its export finance credit with Bank of America. Sales have slumped sharply and two weeks ago the company abandoned for the foreseeable future its three-times postponed attempt to raise private finance in the U.S. Today's meeting in London between senior De Lorean executives and the department following the lodging in New York State Supreme Court at the weekend of a \$18m suit against De Lorean's chairman, Mr John De Lorean, by a former vice-president, Mr William Haddad.

Production of the stainless steel-bodied cars has been cut from 400 a week to 200 at the Dunmurry plant, near Belfast, which employs 2,600 people. The project is expected to bring to a climax several months of negotiations. The department has expressed itself unwilling to provide such a guarantee without itself being underwritten by either of the two Northern Ireland development agencies through which the \$80m government aid provided at last year's Budget channelled - the Northern Ireland Development Agency and the Department of Commerce.

Bank finance

De Lorean says that such a guarantee, which would give access to bank finance at subsidised interest rates, would allow production to resume at closer to its scheduled output of 400 a week in preparation for what it predicts will be a sharp seasonal sales upturn in March. Without the guarantee output can only be sustained at the current level. This could jeopardise at least some of the jobs created in Belfast. The New York court suit follows the sacking of Mr Haddad in connection with allegations of financial irregularities by the company contained in a file handed to Mr Nicholas Winterford, Conservative MP for Macclesfield, by another former De Lorean employee. Mr Haddad was drawn into the affair because of an alleged memo from him to De Lorean concerning company expenditure.

The Director of Public Prosecutions cleared the company of criminal misconduct in the wake of which Mr De Lorean fled seven suits for libel, including suits against Mr Haddad and Mr Winterford. Mr Haddad's suit alleges slander, libel, fraud and "malicious termination of employment for reasons contrary to public policy". Mr Winterford is also suing in counter-suit and says he will continue "at the moment" to press in the Commons the issue of how the De Lorean company has conducted its affairs. Mr Haddad's suit includes allegations relating to the accuracy of the prospectus for public offering planned for last year: the alleged manner in which the company has sought to omit its agreement with the UK Government, the effect on De Lorean executives' and dealers' share holdings and share options of the share offer being made through a new holding company rather than through De Lorean Motor Company; payments to GPD Services, a Panamanian-registered partnership based in Geneva for car development; and the extent of personal prerequisite enjoyed by Mr De Lorean.

Continued from Page 1

French

Credit Agricole, which have special statutes and therefore escape state takeover. Three smaller institutions, registered as ordinary banks, are however, likely now to be added to the list. Shares in the companies concerned were expected to be suspended on the stockmarket today. The main opponents of nationalisation - including the former Economy Minister, M René Monory - expressed satisfaction at the Constitutional Council's decision. The decision is bound to spark off debate about the powers of the Constitutional Council, set up under the 1958 Constitution. The youngest member of the council is 68 and all the members were appointed before the election.

THE LEX COLUMN

The price of the top hat club

Five months after the introduction of new money market arrangements by the Bank of England, Smith St Aubyn, a medium-sized discount house, admitted to having lost £15m - three quarters of its net worth - in the gilt-edged market. The two events may be in no way linked. But Smith's losses focus attention very forcibly on the question of how the houses are to be remunerated for the services they provide. If discount houses are important, they should not need to supplement their income through putting in highly volatile markets.

Ironically, the basic bill business of the houses has been comfortably rewarded since August, and it seems that despite the Smith debacle, the total resources of the market actually grew in the last quarter of 1981. Smith apparently compounded its losses on Treasury 15 per cent 1985 by switching some of this holding into the newly issued partly paid short tap which promptly became a very weak stock. All this took place right under the nose of the Bank of England, which can only have concluded that it was not its job to protect the houses from the consequences of their own mistakes - provided, that is, that only shareholders' money, not depositors' was at stake, and that the system as a whole was not threatened. But perhaps the system is under some sort of general threat.

The houses exist in their present form because the Bank likes to preserve a highly geared buffer, extremely sensitive to slight changes in the wind of official feeling about interest rates, between itself and the banking system. Sensitivity is not everything: the houses must make a living. Under the old system of reserve assets it was easy; banks were required to leave large amounts of money with the houses, often - when the houses' books were full - at low rates of interest. The discount market lived, like the clearing banks' own retail

operations, on an endowment, which for some reason the clearer resented very much. This ony system increasingly came under attack but under the Bank's new arrangements the endowment effect still exists, if in a less prominent form. For the Bank's operations to work smoothly, the houses have to be able to accommodate large amounts of eligible bills at times when the Bank itself is not a substantial holder. To enable the houses to finance their bill books, those banks which want their bills to be eligible for rediscount at the central bank are required to hold an average 6 per cent of their book - the so-called "club money" - with the discount houses. These deposits are a source of relatively cheap money which may be invested in higher yielding bills.

Suppose there were no club money. The houses would have to bid for funds in the interbank market. But they would then be unwilling to hold bills, since the Bank's need to encourage a plentiful supply of bill issues to lubricate its own operations requires that the yield on bills should generally be below the cost of interbank funds. So some degree of subsidy of the houses' deposit base would seem to be required if they are to act as a channel for bills.

Ideally, the houses' dependence on sources of earnings of such low quality as bond market speculation and running margins on cheap deposits should be reduced. Even if the club subscription were brought down from the present 6 per cent, the Bank might eventually like the houses' could still live by making a turn on bills bought from the banks, held and sold on to the Bank of England, or by charging a commission on bills passed straight through. Their would become a pure broking operation - high volume, low margins, and necessarily lower costs. The Bank's control over the club money rate gives it direct influence over the return on capital employed in the discount

market. If it lowers the rate from 6 per cent, a smaller amount of capital will be able to earn an adequate reward. Smith St Aubyn has unwittingly accomplished part of the necessary shrinkage, and it is this consideration that explains the Bank's reluctance to allow any houses but those threatened with extinction to raise rights issues - Smith pulled in less than £10m. But under the present rules, if the market's capital base shrinks so does its capacity to serve the monetary system, since the size of a house's balance sheet is limited, under a crude but long-standing prudential safeguard, to 20 times its net worth. This blunt instrument could easily be sharpened by allowing houses to hold a larger portfolio of low-risk assets - risk being calculated more as a function of capital volatility than of credit standing. So a house that wanted to hold nothing but eligible bills could run a book of, say, 40 times its capital base. Anyone tempted to invest in nothing but War Loan would be restricted to much less than 20 times.

A compromise could be reached through which the discount market as a whole could run a big enough bill book on a small enough capital base to satisfy both the needs of the money markets and the shareholders of the discount houses. It is hard to see how else the Bank can reconcile its own aims of keeping the market in existence and stripping it of all parasitical attributes. In these circumstances, economies of scale would surely take more mergers, and the number of houses could easily halve.

The Bank is trying to expose the discount market to the full winds of competition after decades spent basking on the Galapagos Islands. With luck, leathery and resilient institutions, capable of surviving in the harshest climate, will emerge - the two biggest houses are already most of the way there. Or there could be an empty beach.

Rising U.S. interest rates worry ministers

By David White in Paris

EUROPEAN concern at the recent resurgence of U.S. interest rates was voiced yesterday during a meeting of Finance Ministers from the top Western countries. The "Group of Five" ministers held their talks in an isolated building in the grounds of the Palace of Versailles. They are understood to have discussed mainly the international monetary situations. No announcement was made after the meeting, which brought together Mr Donald Regan, U.S. Treasury Secretary, Sir Geoffrey Howe, the UK Chancellor of the Exchequer, and the Finance Ministers of France, West Germany and Japan.

The issue of Poland's debt to the West is thought to have featured as well in the talks, following a meeting in Paris last week between senior officials of the main creditor countries. Central bank governors from the five countries were also invited to partake in a luncheon at Versailles given by M. Jacques Delors, the French Finance Minister, prior to the meeting. The talks were one of a series of regular informal gatherings of the Group of Five. The meeting was specifically geared to the forthcoming interim committee of the International Monetary Fund, to be held in Helsinki in May.

Budget tax relief plan to boost inner cities

BY ROBIN PAULEY

THE GOVERNMENT is to introduce tax relief in the Budget for companies investing in Britain's depressed and declining inner cities. Treasury ministers and the Inland Revenue have agreed on the least controversial part of the proposal, contained in a confidential Treasury document circulating among senior ministers. This will allow tax relief - principally corporation tax and petroleum revenue tax - on contributions to Enterprise Agencies.

A far more radical and expensive concession is a proposal to allow tax relief for bricks-and-mortar investments in the city areas, recognised by the Government as the most depressed by their designation as programme and partnership authorities. At least one Treasury minister is "worried" by this idea and the Inland Revenue is said in Whitehall to be "wholly hysterical" because it fears it could rapidly escalate into relief costing tens of millions of pounds in revenue. The Government is also casting about anxiously for some positive and imaginative initiatives "to put heart" into the Budget and very few have been forthcoming. The introduction of a system of Urban Development Action Grants on the lines of the U.S. system

may, therefore, also be included in the Budget package. Sir Geoffrey Howe, Chancellor, and Mrs Margaret Thatcher have both accepted the idea, which provides a specific Government grant, loan or subsidy to a local project in inner urban areas, if a substantial portion of the cost has already been committed by the private sector. The intention was to bring the idea forward "some time in 1982" but the attraction of using it to put some glitter into the Budget is gaining ground. Tax relief on Enterprise Agency contributions is really an extension of relief for contributions to Chambers of Commerce. The loss to the Revenue is not likely to be more than about £500,000 a year.

Companies which will gain include all the sponsors of the London Enterprise Agency (Barclays, British Petroleum, British Oxygen, General Electric, International Business Machines, Industrial and Commercial Finance Corporation, Marks and Spencer, Midland Bank, Shell, United Biscuits and Whitbread). Agencies in the provinces include Birmingham, St Helen's (principally Pilkingtons), Leeds (many locally based firms), Bristol (Imperial Tobacco), Norwich (Bally Shoes, banks,

Reckitts and Norwich Union), west Cornwall and some British Steel sectors (Cardiff, Cleveland, Cumbria and Shotton). A long-standing problem has been how to encourage medium-sized, locally based companies to make big investment in deprived, commercially unattractive areas. This is where the wider-scale tax relief plan comes in.

BP, for example, is particularly anxious to put large sums into inner cities rather than petroleum revenue tax. The arguments against the plan centre on fiscal purity and the undesirability of reliefs (except mortgage relief) and the danger of abuse. But the Cabinet is moving to the view, strongly put by Mr Michael Heseltine, Environment Secretary, that although one or two schemes have already started without tax relief, big incentives are needed to attract private sector resources to solve an urgent problem. A similar scheme was pencilled into last year's Budget but was deleted the Friday before Budget day, because the revenue and expenditure columns were out of balance. The scheme, or part of it, is thought to have been guaranteed inclusion this year because of the inner city riots last summer.

TUC cautious on militant action over Bill to curb union powers

BY CHRISTIAN TYLER, LABOUR EDITOR

THE TUC is unwilling to lead the trade unions into industrial retaliation against the Government's proposed new labour relations legislation, or to pull out of the tripartite National Economic Development Council in a confidential paper circulated to unions ahead of Wednesday's meeting of the TUC employment policy and organisation committee discloses that Congress House is taking a cautious view of militant proposals put up by major unions. But last night it looked as though there would be a revolt against the mild strategy proposed in the TUC's 10-page document and that a majority of union leaders on the committee would insist on a tougher line being taken. The main suggestion, from the General and Municipal Workers Union, is that the TUC should co-ordinate action by unions across whole industries if an employer in that industry sues a union for damages. This

appears to have sufficient support among other unions to become part of the TUC campaign eventually. But there is less consensus for the Transport Workers' demand that the TUC pull out of NEDC and its industrial sector working parties. The Government is expected to publish its Bill on trade union immunities and the closed shop in two weeks, and hopes to put it on the statute book by mid-summer. It will be called the Employment Bill, like its predecessor from this Government, now the Employment Act, 1980. Some minor changes to the consultative document published in November by Mr Norman Tebbit, Employment Secretary, are expected. Proposals for greatly increasing financial compensation for closed shop victims may be modified in the light of objections from the CBI that they could bankrupt smaller firms. The scale of damages payable by unions once

their "corporate immunity" has been withdrawn by the legislation may also be changed to meet objections from Conservative trade unionists. But no decision has yet been taken on the major question of whether to stiffen the proposal for making "union-only" tenders and contracts illegal. Building employers have demanded that trade unions should lose their immunity from prosecution if workers go on strike to keep non-union labour off building sites. The TUC strategy document concentrates on public demonstrations rather than industrial retaliation, arguing that it is not the TUC's job to decide when strikes should begin and end. It also says that the TUC would become liable to suits for damages under the Tebbit Bill if it directed operations. It is also cautious about a GMBW suggestion that the TUC should boycott periodic ballots to review closed shop agreements.

Tebbit predicts jobless over 3m

BY OUR POLITICAL CORRESPONDENT

MR NORMAN TEBBIT, the Employment Secretary, yesterday gave the firmest indication yet that the Government expects unemployment to exceed 3m this month. He said that a combination of the usual seasonal factors and the abnormally bad weather, meant that it was "extremely" likely unemployment would go over 3m in January. He also predicted that unemployment would go on rising through the first part of this year, but that the downward trend would be sufficiently well established by the next election to ensure victory for the Conservative Party. His warning came as MPs returned to London today for the start of a new term in which concern about unemployment is again likely to be

the over-riding issue. The Conservative Party has been bracing itself for unemployment to reach 3m for several months, but even so the breaking of the 3m barrier is almost certain to increase the pressure from a very vocal section of its own backbenchers for re-election. It may also have the effect of helping to unite Labour MPs, who will be hoping to show that the accord reached between Labour and union leaders at Bishop's Cleeve really did mark a turning point for the party. Though in the short term MPs may be preoccupied with the rail dispute and the effects of the weather, the Budget on March 9 will be the focal point of the new term. Increasingly, those Tories with doubts about the Government's policies see it as the

one last chance of saving the next election for the Conservatives. Over the next few weeks, the so-called "wets" both inside and outside the Cabinet are expected to hold a series of private meetings in an attempt to co-ordinate an alternative strategy, probably involving a reflationary package of £2-3bn. Yesterday, London Weekend Television published an opinion poll, carried out by Opinion Research Centre which Tory left-wingers are likely to use in support of their argument for reflation. It showed that unemployment is regarded as the most important issue by 80 per cent of those voters who, while not intending to vote Conservative at the moment, say they might eventually be persuaded to do so.

Weather

UK TODAY

CLOUDY with rain in the West and North. Sunny in the East and centre. London, South East, Midlands, Central North and N.E. England. Bright or sunny, some fog clearing. Max. 9C (48F). Other areas. Mostly cloudy, some rain or drizzle, fog on coasts. Max. 11C (49F). Outlook: Mostly dry, apart from a little rain in the NW. Overnight fog clearing slowly, some night fog.

WORLDWIDE

Table with 3 columns: Location, Y'day, Y'day. Lists weather forecasts for various global locations like Algiers, Amst, Athens, Bahrain, etc.

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